HOME FLOWER-GROWING

EMIL C. VOLZ

RURAL SCIENCE SERIES

Edited by L. H. Bailey

HOME FLOWER-GROWING

By EMIL C. VOLZ

Professor of Floriculture, Iowa State College

This is a book for the person who would grow flowers and decorative plants at home for pleasure, indoors and out, and who wishes to understand the principles and practices necessary for success.

The amateur gardener will find here all he needs to know about plant propagation and culture, how and where to grow flowers and plants for best results, in the open ground, as part of the home planting scheme, indoors in winter, in window boxes, hanging baskets, rock gardens, or water gardens; and how to arrange cut flowers for best effects

The book also gives suggestions on organizing a garden club, with suggested constitution and by-laws, topics for discussion, holding community flower shows, their management, exhibits, and judging.

Professor Volz knows at first hand the needs of students, both in college classes and at home. He has held teaching positions at Cornell and Illinois, is a frequent contributor to the gardening magazines, and knows intimately through his lectures and correspondence both the growers who supply seeds and plants, and the home gardeners who enjoy them.

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FIG. 1.—"Flowers are the beautiful hieroglyphics of Nature, by which which she indicates how much she loves us."—GOETHE.

HOME FLOWER-GROWING

BY

EMIL C. VOLZ

PROFESSOR OF FLORICULTURE, IOWA STATE COLLEGE

New York

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THIS BOOK IS AFFECTIONATELY
DEDICATED TO MY PARENTS
WHO GAVE ME MY FIRST INSPIRATION IN
FLOWER-GROWING
AND TO MY WIFE
WHO HAS BEEN OF CONSTANT ASSISTANCE
AND INSPIRATION TO ME
IN THE PREPARATION OF THIS MANUSCRIPT

PREFACE

During the past ten years the growing of flowers both for pleasure and for profit has shown remarkable progress in all communities. The great war gave a special impetus to gardening and out of it grew an army of confirmed plant-lovers. A demand for practical flower-growing literature has also developed, but in this age of popular books and magazines with their fragmentary contributions the average person is often confused by this mass of scattered material. Some colleges and secondary schools are offering courses in elementary floriculture in an endeavor to assist beginners with garden information. In preparing the material for this book, I have largely in mind the needs of my own students enrolled in the courses in Home Floriculture and Garden Flowers. At the same time it is the aim of this publication to present to the general reader in simple and concise form the principles underlying modern home flower-growing. By means of correspondence and personal interviews with flower-lovers and garden-club members in many communities the author has attempted to determine the essential needs of those interested in this problem.

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EMIL C. VOLZ.

Iowa State College, Ames, Iowa
January, 1928.

CONTENTS

CHAPTER I

	PAGES
THE NATURE OF THE PLANT	1 - 8
Roots	2 - 4
Stems	4 - 5
Leaves	5 - 6
Flowers	7
Fruit	7
Plant-growth essentials	7 - 8

CHAPTER II

PLANNING THE FLOWER-GARDEN	9 - 21
Flower-beds versus borders	10 - 16
Color in the garden	16 - 18
Color combinations	18 - 21
Use of a single color	18
Tints and shades	18
Variations of a single color	18 - 20
Color contrasts	20
Mixed colors	20 - 21

CHAPTER III

OUTDOOR FLOWER-GROWING	22 - 27
Garden soils	22 - 24
Fertilizers	24 - 26
Planting the garden	26 - 27

CHAPTER IV

CARE AND MAINTENANCE OF THE GARDEN	28 - 38
Propagation of garden flowers	28 - 33
Seeds	29 - 30
Propagation by division	30 - 33
Insect and disease control	33 - 36

CARE AND MAINTENANCE OF THE GARDEN—*Continued.* PAGES
Garden equipment and care . . . . . 36 - 38
Weeding 36
Thinning 36
Staking 37
Watering 37
Mulching . . . . . 37 - 38
Pruning 38

CHAPTER V

ANNUALS . . . . . 39 - 69
Cultural requirements of annuals . . . . . 41 - 42
China aster . . . . . 42 - 44
Insects 43
Diseases . . . . . 43 - 44
Garden varieties 44
Pansy . . . . . 44 - 45
Gloxinia penstemon . . . . . 45 - 48
Petunias . . . . . 48 - 49
Varieties . . . . . 48 - 49
Snapdragons . . . . . 49 - 50
Varieties 50
Sweet peas . . . . . 50 - 51
Varieties 51
Zinnia . . . . . 51 - 52
Varieties 52
Miscellaneous important annuals . . . . . 52 - 69
Hardy annuals . . . . . 54 - 58
Annuals that are somewhat tender to cold . . . . 58 - 64

CHAPTER VI

HARDY HERBACEOUS PERENNIALS 70–120
Columbine . . . . . 74 - 76
Important American species 74
Introduced species 75
Propagation and cultivation . . . . . 75 - 76
Hardy aster . . . . . 76 - 78
Important species 77
Named hybrid varieties of popular species 77
Propagation and cultivation 78
Chrysanthemum . . . . . 78 - 81
C. coccineum 78
C. morifolium . . . . . 78 - 80
C. maximum . . . . . 80 - 81
Larkspur . . . . . 81 - 82
Propagation and cultivation . . . . . 81 - 82
Garden varieties and species of delphinium 82

HARDY HERBACEOUS PERENNIALS—*Continued.* PAGES

Hardy pinks . . . . . 82 - 84
Important species 84
Iris . . . . . 84 - 88
Beardless or Apogen iris 86
Bearded or Pogon iris 86
Bulbous iris 86
Propagation and cultivation . . . . . 86 - 88
Hardy poppies . . . . . 88 - 90
P. orientale . . . . . 88 - 89
P. mulicaule . . . . . 89 - 90
Peonies . . . . . 90 - 94
Important garden species . . . . . 90 - 93
Propagation and cultivation 94
Hardy phlox . . . . . 94 - 97
Low-growing, spring-flowering 95
Semi-erect, spring-flowering 95
Erect, summer-flowering . . . . . 95 - 96
Garden varieties of hardy phlox 96
Propagation and cultivation . . . . . 96 - 97
Miscellaneous perennials 97-117
Twenty-five spring-flowering perennials 97-102
Thirty early summer-flowering perennials 102-108
Thirty late summer-flowering perennials 108-112
Twenty-five autumn-flowering perennials 112-117
Biennials and perennials grown as biennials 118-120

CHAPTER VII

GARDEN ROSES 121-139
Roses for cold climates 121-128
Hybrid Perpetual 121-124
Hybrid Rugosa and Rugosa roses 124
Moss roses 124
Hybrid Tea roses 124-126
Dwarf Polyantha or Baby Rambler roses 126
Miscellaneous hardy rose hybrids and species 126-128
Hardy climbers or rambler roses 128
Roses for mild and warm climates 128-129
Cultivation of roses 130-134
Controlling insects and diseases 134-136
Winter protection 136-137
Recommended list of roses for general planting . . . 137-139

CHAPTER VIII

BULBOUS PLANTS FOR THE GARDEN 140-166
Spring-flowering hardy species 142-149
Narcissus 142

BULBOUS PLANTS FOR THE GARDEN—*Continued.*
Spring-flowering hardy species—*Continued.* PAGES
Galanthus nivalis 142
Tulipa 143–146
Hyacinthus orientalis 146
Fritillaria 146
Scilla sibirica 146
Chionodoxa Luciliæ 146
Muscari botryoides 146
Crocus vernus and *Susianus Iris* 146
Cultivation of spring-flowering bulbs 148–149
Hardy garden lilies 149–154
Important species 151–152
Open-flowered lilies 152
Turban-shaped lilies 152
Upright-flowered lilies 152
Miscellaneous garden species 152–153
Cultivation of garden lilies 153–154
The gladiolus 154–158
Garden types 155
Propagation 155–156
Cultivation 156–158
The dahlia 158–164
Classification of garden varieties 158–161
Propagation 162
Cultivation of dahlias 162–163
Diseases and insects 163–164
Winter care of Tubers 164
Cannas 164–165
Green-leaved varieties 164
Bronze-leaved varieties 165
Propagation and culture 165
Miscellaneous tender bulbs for summer flowering . . . 165–166

CHAPTER IX

GARDEN FLOWERS FOR SPECIAL PURPOSES 167–191
Rock-gardens 167–178
Suggestions on construction 169–177
Plant material for rock-gardens 177–178
Wild-gardens 178
Water-gardens 179–188
Suggestions on construction 180–181
Planting and care 181–184
Selecting plants for aquatic gardens 184–188
Climbing flowering plants 188–191
Annual flowering vines 188–190
Hardy perennial flowering vines 190–191

CHAPTER X

PAGES

Everlastings and Evergreens for Winter Bouquets . 192–200
Annual everlastings 196–199
Perennial everlastings 199–200
Ornamental fruit and seed-pods 200

CHAPTER XI

House Flowers Grown 201–221
Soils and fertilizers for house-plants 201–203
Plant containers 203–206
Potting 206–208
Propagation of house-plants 208–212
Cuttings 209–211
Growing house-plants from seeds 211–212
Winter care of house-plants 212–215
Atmosphere 213
Temperature 213–214
Night 214
Watering 214–215
Summer care of house-plants 215
Diseases and insects on house-plants 215–217
Diseases 216
Insects 216–217
Hotbeds and coldframes 217–221
The pit hotbed 218–220
The surface hotbed 220
Ventilating and watering 220–221
Starting flower seeds in hotbeds 221
Coldframes 221

CHAPTER XII

Flowering House-Plants 222–238
Azalea 222–224
Begonias 224–226
Calla 226
Cyclamen 226–227
Chrysanthemum 227
Fuchsia 228
Geranium 228 230
Impatiens 230–231
Primrose 231
Flowering maple 231–232
Lily-of-the-Nile 232
Japanese astilbe 232–234
Cacti and other succulents 234–235
Cineraria 235

FLOWERING HOUSE-PLANTS—*Continued.* PAGES
Heliotrope 236
Wax-plant 236
Hydrangea 236–237
Oleander 237
Pansy 237–238
Petunias 238
Jerusalem-cherry 238

CHAPTER XIII

FOLIAGE HOUSE-PLANTS 239–257
Artillery plant 239–240
Asparagus 240–242
Begonia-foliage types 242
Cast-iron plant 242–244
Coleus 244
Cordyline 245–246
Croton 246
Dragon-plant 246–247
Ferns 247
Sword ferns 247–248
Holly fern 248
Spider ferns 248
Maidenhair ferns 248
Cultivation of house ferns 248–250
Leopard plant 250
Bowstring-hemp 250–252
Norfolk-Island-pine 252
Palms 252–254
Screw-pine 255
Rubber-plant 255–256
Silk-oak 256
Umbrella plant 256–257
Variegated grass 257
Vines for indoor culture 257
Wandering Jew 257

CHAPTER XIV

BULBS FOR HOUSE CULTURE 258–271
Hardy spring-flowering bulbs 260–267
Hyacinths 260
Tulips 260–262
Narcissus 262
Other bulbs 263
Preparing bulbs for forcing 264
Storage of potted bulbs 264–266
Forcing bulbs 266–267
Growing bulbs in water 267

BULBS FOR HOUSE CULTURE—*Continued.* PAGES
Cape bulbs 267–268
Miscellaneous bulbs 268–271
Amaryllis—Hippeastrum 268–270
Calla 270
Gladiolus 270–271
Gloxinias 271

CHAPTER XV

WINDOW-BOXES AND HANGING-BASKETS FOR THE HOME . . 272–280
Window-boxes 272–278
Hanging-baskets 278
Miscellaneous plant-containers 278–280

CHAPTER XVI

ARRANGEMENT OF CUT-FLOWERS IN THE HOME 281–300
Cut-flowers and their care 281–286
Special methods for keeping flowers 284–286
Packing and shipping cut blooms 286
Flowers for exhibition purposes 286
Cut-flower arrangement 286–300
Containers 289–290
Table decorations 290–294
Miscellaneous decorations 294–298
Home weddings 298–300

CHAPTER XVII

FLOWERS AND THE COMMUNITY 301–325
Garden clubs 301–310
Essential steps in the organization and maintenance of a garden club 302–304
Suggested list of topics for meetings 304–307
Suggestions for securing garden-club speakers . . . 307
Suggested constitution and by-laws for a garden club . 307–310
Flower shows 310–325
Management of flower shows 312–314
Schedules or premium lists 314–322
Staging the show 322–323
Judging 323–325

INDEX 327–342

LIST OF ILLUSTRATIONS

FIGURE		PAGE
1.	"Flowers are the beautiful hieroglyphics of Nature, by which she indicates how much she loves us."—GOETHE.	*Frontispiece*
2.	A well-planned extensive garden with a note of formality	11
3.	A formal flower-bed in the wrong setting may be a monstrosity	12
4.	Enclosed flower-beds lack the charm of natural borders	12
5.	Left, an informal border of perennials. Right, a natural background of trees and shrubs	13
6.	Above, flower-gardens need not be large to be attractive. Below, for backgrounds, lattice fences show innumerable possibilities	15
7.	Bird baths add a note of interest to the flower-garden	17
8.	Above, the yucca is primarily an accent plant. Below, an example of pronounced contrast, white Shasta daisies and blue veronica	19
9.	A corner in a blue border, dwarf blue aster and baptisia	21
10.	Seedlings of hardy perennials at home in a coldframe	29
11.	A cheese-cloth screen protects young plants	30
12.	Lath screens are useful when starting plants from seed in hot weather	31
13.	Flower seedlings in thumb-pots plunged in the soil of a coldframe to maintain uniform moisture	32
14.	*Penstemon gloxinoides* variety Sensation, a noble substitute for snapdragons	46
15.	Above, Rosy Morn petunias are popular as bedding plants. Below, an effective mass planting of Balcony white petunias	47
16.	Annual larkspur is particularly effective when garden conditions permit to self-sow	53
17.	Above, succession plantings of candytuft. Below, arctotis is lovely in the gray section of the border	55
18.	Above, single blooms of opium poppy. Below, cleome or spider-flower	57
19.	Above, single and double annual gaillardia. Below, scabiosas or pincushion-flowers	59
20.	*Gilia capitata,* a blue-flowered annual of merit	61
21.	Above, the satiny pink blooms of lavatera resemble small	

FIGURE PAGE

hollyhocks. Below, the old-fashioned four o'clock as a temporary hedge 62
22. The sweet-scented white nicotiana is adapted to moonlight gardens 63
23. The coloring of salpiglossis is unmatched in other garden annuals 65
24. Long-spurred aquilegias or columbine 73
25. For autumn bloom no hardy flowers can compare with native asters 76
26. Above, *Dianthus plumarius,* Scotch pink. Below, the Shasta daisy 79
27. The German iris should be planted in bold masses for striking color display 83
28. Tulips are excellent companion flowers to iris 85
29. Above, the oriental poppy. Below, yellow flag, *Iris Pseudacorus* 87
30. Peonies are distinctly the flower for every man's garden . 91
31. An interesting planting of peonies in combination with a lattice arch 93
32. The bleeding-heart 99
33. Above, hostas or plantain-lilies. Below, hemerocallis is useful as a border plant or in connection with water-gardens 101
34. Left, *Clematis recta.* Right, thalictrum 103
35. Above, coreopsis, suitable for borders or cut-flowers. Below, when other flowers have succumbed to frost, gaillardias still maintain their rugged beauty 105
36. Above, the steel-blue globular heads of echinops. Below, platycodon or balloon-flower 107
37. Mist-like sprays of *Gypsophila paniculata,* effective in garden or basket 109
38. Rudbeckias, or coneflowers, are amongst the showiest of yellow perennials 115
39. *Sedum spectabile* or showy sedum 116
40. Above, planting of foxglove. Below, goldenrod is one of the most beautiful native plants 117
41. One never tires of the stately hollyhock 119
42. Hybrid Perpetual roses are characterized by a stiff upright growth 122
43. Above, Hybrid Perpetual rose "Frau Karl Druschki." Below, Hybrid Tea rose "Jonkheer J. L. Mock" . . 123
44. Dwarf Polyantha or Baby Rambler roses are highly satisfactory for general garden planting 125
45. A porch trellis featuring the old favorite "Dorothy Perkins" 127
46. Climbing American Beauty trained as a pillar rose . . 129
47. Rough cedar posts are satisfactory supports for climbing roses trained as pillars 130

FIGURE PAGE

48. A wire fence effectively covered with hardy ramblers . . 131
49. Hybrid Tea roses are pruned severely each spring. . . 132
50. In pruning Hybrid Perpetual roses, about two-thirds of last year's growth should be removed 133
51. Spring pruning of Rugosa and other bush roses encourages the growth of more flowering wood 134
52. Hardy climbing roses are best pruned after the flowering season 135
53. Cross-section of a bed of Hybrid Tea roses showing method of protection for cold climates 136
54. Short-crowned narcissus and double early tulips in happy combination 141
55. Single early tulips are ideal for formal beds 143
56. Darwin tulips are most satisfactory spring-flowering bulbs 144
57. Pansies are the natural companion of tulips and other spring bulbs 145
58. The fragrant hyacinth loses none of its beauty when grown out-of-doors 147
59. The crocus feels at home in any garden setting 148
60. Above, larkspur as a background for regal lilies. Below, a mass planting of candidum and regal lilies 150
61. The regal lily is a marvel for size and production of bloom 151
62. Decorative dahlia 157
63. A rather unusual support for dahlias 158
64. Attractive rock-gardens 168
65. Above, *Dianthus deltoides.* Below, *Campanula carpatica* 176
66. Queen Annes lace is adequately fitted to the needs of the wild-garden in midsummer 179
67. The water-lily is the queen of all aquatic plants . . . 180
68. A well-designed informal pool 182
69. Above, a formal water-garden featuring water-lilies, cattails and water hyacinth 185
70. Above, basket arrangement of strawflowers. Below, a bowl of everlastings 193
71. Basket arrangement of strawflowers 195
72. Kinds of strawflowers 197
73. Left, *Gomphrena globosa.* Right, *Ammobium alatum* . 198
74. *Catananche caerulea,* a hardy perennial everlasting . . 199
75. Potted ferns plunged in moss to control soil-moisture conditions 204
76. Fernery with metal liner and inner liner 205
77. The inner liner permits excess soil-water to escape through drainage holes 206
78. Root system in proper condition for shifting to larger sized pot 207
79. Chrysanthemum cuttings in various stages of root formation 209

FIGURE PAGE

80. Above, concrete hotbeds. Below, wooden coldframes covered with elevated hotbed sash 218
81. Left, begonia "Melior." Right, azalea 223
82. Left, *Primula obconica*. Right, *Begonia semperflorens* . 225
83. Left, impatiens as a house-plant. Right, geranium . . . 229
84. Cactus blooms are always showy and interesting . . . 233
85. The crab or Christmas cactus 235
86. Artillery plant or *Pilea microphylla* 240
87. Above, Boston fern. Below, *Asparagus Sprengeri* . . . 241
88. Left, *Pandanus Veitchi*. Right, Rex begonia 243
89. *Cordyline* or *Dracaena indivisa* 245
90. Above, grevillea or silk-oak, English ivy as a trellis subject. Below, cyrtomium or holly fern, the leopard plant 249
91. The miniature pteris fern 250
92. Left, bowstring-hemp. Right, araucaria or Norfolk-Island-pine 251
93. Palms are dignified house-plants 253
94. An indoor bulb garden 259
95. Dutch hyacinths 261
96. Double narcissus "Von Sion" 263
97. Crocus make good pot subjects 265
98. A pot-grown amaryllis 269
99. Above, window-box plants which will endure shade. Below, window-box for sunny exposure 273
100. Coleus, begonias and crotons provide rich colors in this foliage combination 274
101. Above, indoor window-box featuring special arch and bird-cage. Below, English ivy as a contrasting note to fernery 275
102. Left, *Asparagus Sprengeri* in hanging-basket. Right, Boston fern 279
103. Above, gladiolus cut as soon as several of lower buds have opened. Below, pink lavatera and light blue delphinium as table decoration 285
104. Useful bowls and vases for the average home 286
105. An old-fashioned bouquet of mixed garden annuals . . 288
106. Sweet peas and small chrysanthemums 291
107. A low basket of mixed garden flowers 293
108. Lythrum and rudbeckia in tall basket 295
109. Christmas decorations 297
110. Left, basket for formal occasions. Right, Shasta daisy and blue speedwell, an informal decoration 299
111. Display of flowers staged by amateurs at average county fair 311
112. Baskets of wild flowers staged in store window 313
113. Special arrangement of cut-flower exhibits add beauty to any horticultural exposition 315

HOME FLOWER-GROWING

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CHAPTER I

THE NATURE OF THE PLANT

Floriculture is the expression of art as well as of science. Flowers are the ultimate goal but, before this goal can be achieved, certain requirements must be met. It is true that some plants are like Topsy and "just growed" naturally but, in the successful cultivation of ornamentals in and out of season, specific knowledge of what a plant is and how it grows is essential.

The unit of plant structure is the cell and in very low forms a single cell comprises the entire plant. All the higher plants, and this includes the numerous cultivated flowering species, are composed of many cells. The contents of these cells change as the plant matures. The function of the cell also varies greatly depending on its location. The cells of the tiny rootlets are constructed to take up water from the soil. Other root cells grow and divide very rapidly, pushing their way through the soil particles. Certain other cells in the stems and leaves act as conducting units or pipe lines through which plant-food passes from one location to another. Still other cells are able to store some of this plant-food to be used by the plant at a later time. The most remarkable cell structure is in the leaves. These

tiny parts are minute chemical laboratories and by means of the action of light and air convert food into usable forms. A microscopic study reveals that although the individual cell is a distinct unit, it responds with many other similar cells in the performance of required activities. This organized growth and union of activities make possible the formation of tissues. The tissues in turn combine to make plant parts or organs, ultimately resulting in the complete and assembled structure of the plant itself.

A working knowledge of how plants grow may be obtained from a study of the various parts: roots, stems, leaves, flowers, and fruit.

ROOTS

Soil is nature's medium of sustaining plant growth. A normal plant is a balanced organism and the underground parts or root system may represent practically as much bulk in the form of tissues as the upper parts consisting of stems, leaves, flowers, and fruit. The vast network of root-hairs and fibrous roots among the soil particles anchors the plant and gives it mechanical support. A second function of this wonderfully complicated arrangement is to provide a means of extracting certain chemical elements as nitrogen, phosphorus, potassium from the soil. These elements comprise the food particles which support and make possible plant growth. The extracting process is literally absorption and the minute root-hairs at the tips of the smallest rootlets are the absorbing agents. The food elements can be taken up only by the root-hairs in dissolved form, hence the importance of moisture in the soil. Most higher plants use all these absorbed elements for immediate growth but

some perennial species have specially constructed roots that act as food reservoirs or storage organs. Common examples of thickened storage roots are in the peony, dahlia, asparagus. A thorough understanding of this food-storing ability of some species is helpful in their propagation and culture.

The cells of a normal root absolutely require oxygen for healthy development. A wet soggy condition of the soil precludes the presence of oxygen and the inevitable result is root decay. Most house and garden plants cannot live in a state of perpetual "wet feet," a common fault in the cultivation of plants in jardinieres, window-boxes and so-called ferneries. The situation can be remedied by providing adequate soil drainage. Practical suggestions along this line are given in the chapters on house and window-box plants.

It has been stated that moisture is essential to plant growth. There is a danger, then, in having the soil medium too dry. An extremely dry soil injures the root-hairs, cuts off the food and water supply, and if carried far enough results in wilting of the stems, leaves, and flowers. Repeated wilting may so weaken the plant that it may not recover. It is exceedingly difficult to give specific instructions on the watering of plants because conditions vary widely. Over-anxiety on the part of the grower is sometimes the cause of mistreatment of plants. Daily superficial sprinkling of the lawn and garden in hot weather may do more harm than good. Repeated applications of water to the upper layer of soil will encourage the development of root-hairs in that region. The blistering heat of the summer sun may kill these tiny roots almost as fast as they develop while, in the meantime, no encouragement is given to

the formation of feeding areas in the lower soil regions. The result is a stunted and under-nourished plant.

A final factor in the behavior of roots is the type of soil in which the plant is growing. So-called heavy soils that bake hard on drying offer so much resistance to the rootlets that growth is very slow and may stop entirely. Soils of moderately loose texture provide the correct conditions.

STEMS

Stems are either erect as in the geranium, prostrate as in the verbena, or climbing as in the morning-glory. Stem growth begins where the roots leave off and is usually aerial in nature. Some species, however, feature underground stems and those partly underground. The upper stems or branches bring the leaves into the proper light relation. Others act as food-storage organs. The ability of stems to store food has made it possible to use them in propagating some species. When a slip or cutting of the stem is placed in sand for root formation, the latter is brought about by the presence of reserve food in the stem tissues.

Structurally, stems vary in detailed characteristics but a conducting system is common to all. Many are divided into lateral branches each responsible for definite leaf area. In older branches the once tender epidermal tissue is transformed into hardened bark covering. This is primarily for protection. Woody stems are the rule when the entire plant is hardy enough to resist the effects of freezing. Roses, lilacs, and other shrubs are examples. Some tropical species also have woody stems but they must be grown under the protection of a greenhouse to keep them alive. Rubber plants and palms

belong here. Herbaceous plants have stems composed of soft tissues, rather perishable in nature. By far the greater number of plants included in this volume must be classified as herbaceous.

The growth and general behavior of stems can be altered considerably by cultural conditions. Crowding of plants cuts off sunlight from the interior areas and a spindling type of stem results. The height of the plant is increased but the respective branches are weakened. Allowing too many branches to remain not infrequently reduces the number and especially the size of the blossoms. Florists practice pruning of chrysanthemums and other flowering plants to concentrate the energy on a few well chosen branches.

LEAVES

Foliage is so constructed that a maximum amount of surface is exposed to the action of light. That is why leaves are generally flat and thin. A close observer will note that leaves are so attached to the branches that the greater part of the flat surface is turned toward the light. There must be a reason for this. A careful study of the leaf make-up reveals that it is prepared to carry out most of the activities required for the life of the plant. Tiny openings which the botanist calls stomata are scattered over the upper or under surface or sometimes both surfaces of the leaf. The stomata assist in the eliminating of water-vapor from the surfaces of the leaves. Transpiration is the term given to the water elimination and it is a necessary process in the growth of the plant. Normal leaves are green in color due to presence of a substance called chlorophyll. The action of light upon the chlorophyll promotes the elaboration of organic food materials.

There is an exchange of gas between the leaf tissues and the atmosphere surrounding them. In this process carbon dioxid is absorbed and oxygen is given off. When the required chemical transformations are complete, sugars are changed into starch, the latter being in the form most adaptable for nourishing the plant. The entire complicated process is known as photosynthesis. In animal life, respiration is a common term. It also applies to plant life in a modified way. Respiration in plants also takes place in the leaves and this phenomenon gives rise to the taking in of oxygen and the elimination of carbon dioxid. Practically the reverse action takes place in photosynthesis and, strange to say, involves nearly the same plant organs.

Leaves are often so complete in their composition that they function as stems and may be used for propagating purposes. Leaf-cuttings of begonias are as easy to root as slips or stem-cuttings.

Obviously, it is difficult to over-estimate the importance of leaves from the standpoint of growth activities. They are, therefore, fit subjects for special care in the hands of the grower. A lack of soil-moisture reduces the food supply. It also causes the leaves to wilt, which if carried to extremes is very harmful. Too much water at the roots results in a checking of growth processes. Very dry air surrounding the leaves forces the latter to transpire abnormally and may invite insect attack. Illuminating gas and other poisonous substances in the atmosphere cause the leaves to turn yellow. Foliage also reacts to light intensity. The natural light requirements of each species should be supplied if possible,—full shade for some, partial shade for others, and full sunlight for the plants accustomed thereto in their native habitat.

FLOWERS

The flower itself is the objective of most garden effort. Flowers are desired for beauty of color, form, and fragrance. In nature, the flower contains the organs that form the seeds which in turn reproduce the species. For superior development normal growth is essential. Man has employed various means to improve the bloom in size, color intensity, continuous bloom, degree of doubleness, length of stem, and keeping quality. Some of the means employed include hybridization, selection of special seed parents, pruning and disbudding, and special feeding.

FRUIT

After the flower comes the fruit. A few plants are cultivated for their decorative fruits. The outstanding examples of this group are ornamental peppers, Jerusalem cherries, moneywort, and some roses. As most home-gardeners buy their flower seeds, the production of plants for their fruit or seed does not interest them, so that a long discussion of this subject is unnecessary.

PLANT-GROWTH ESSENTIALS

In the light of the foregoing, it is evident that definite conditions must exist to encourage growth. These essentials are a generous water supply, sufficient assimilated food from both the soil and air, correct temperature within certain limits, a supply of oxygen, and in the case of green plants, proper light. Practical suggestions on watering plants, fertilizers, temperature control, ventilation (for house-plants), and light control will be found in the chapters on outdoor and indoor flower-growing.

A plant is a delicate and complex organism and is affected by all the conditions under which it is grown. The more the gardener knows about the organism the greater is the likelihood that the essential conditions will be provided and the greater, also, should be the satisfaction in the work. Collateral reading is very helpful and provides a definite method of widening one's horizon in the plant world. Systematic reading should be followed by actual practice in carrying out the new ideas brought out in current garden literature. A final suggestion is to urge beginners to associate as much as possible with experienced gardeners. As a rule, persons who work with plants are very unselfish and willing to help others out of their rich experience. It is inspiring to know real plant-lovers.

CHAPTER II

PLANNING THE FLOWER-GARDEN

JANUARY is the month when New Year's resolutions are abundant, and it is an excellent time for the home-gardener to make a special effort in favor of a well-planned flower-garden. New seed catalogues are arriving and should receive prompt and earnest consideration. A good seed catalogue is as fascinating as a magazine or a good book. Seeds and plants of all kinds, bulbs, roots, fertilizers, insecticides, plant disease remedies, garden tools and implements are the timely topics included, and they should be studied carefully with the idea of preparing an early order. This is also the time to think about a garden plan which is an all-the-year-around convenience to the flower-grower. A well-ordered plan supplemented with a garden diary or notebook has many advantages, and may prevent any or all of the following embarrassments:

1. The seedsman may be sold out of the particular kind of seed required to make the flower-border a success.

2. Late orders are seldom filled with dispatch by the seedsman or nursery.

3. It is better to settle all horticultural differences in the safe confines of the living-room long before the actual planting season arrives.

4. Garden triumphs and failures of past years should

not be forgotten. It is pardonable to forget the failures as such, but it is also desirable to remember long enough not to repeat them.

FLOWER-BEDS VERSUS BORDERS
(Figs. 2-7)

It is safe to say that no two flower-gardens are exactly alike. That is just what makes them so interesting to the owners and their friends. Making a flower-garden is making a picture and a simple arrangement is most pleasing. Although flowers are the important item in the composition, they must not be considered as the only requirement. The finished garden must have inclosure and background, open spaces, and convenient walks. As most home-gardens are informal in design, it is best to arrange the flowers in masses or clumps. Borders are better than beds. The latter should be reserved for formal gardens where an elaborate display is usually necessary. Flower-borders may vary in width from three to twelve feet and their length is determined by the particular location in the home grounds. The sides may be straight and parallel or curved and wider in parts. Very wide borders are difficult to maintain properly so an average width of six to eight feet is recommended. Clipped hedges, mixed shrub plantings, or vine-covered lattice fences make excellent backgrounds for flowers. Too much cannot be said in favor of grass paths or open lawn areas in connection with flower-gardens. Walks should be used for convenience and only where needed. Stepping stones, graveled walks, brick or tile all have a place in some designs, but they should never be overdone.

During recent years many persons have become interested in special kinds of gardens. Rock-gardens, water-

FIG. 2.—A well-planned extensive garden with a note of formality.

gardens or pools, and wild-gardens are now exceedingly popular. A rock-garden properly constructed in a natural setting where one really expects to find rocks is

FIG. 3.—A formal flower-bed in the wrong setting may be a monstrosity.

FIG. 4.—Enclosed flower-beds lack the charm of natural borders.

excellent. The same is true of pools or water-gardens. But the mere fact that one's neighbor boasts of one or the other is not always a good reason for doing the same with an area which may be better fitted for a simple

Fig. 5.—Left, an informal border of perennials. Right, a natural background of trees and shrubs.

border planting of flowers or an old-fashioned cut-flower garden.

Knowledge of plant material is essential in planning a flower-border or complete garden. The best effects are secured by those who know exactly how the chosen plants will behave under normal conditions. There are fourteen points involved in this plant study.

1. Length of life of plant. Is it an annual, a biennial or perennial?
2. Height under different soil and moisture conditions.
3. Lateral spread or breadth.
4. Growing habit—prostrate, erect or climbing.
5. Time and length of flowering period.
6. Color of flowers.
7. Color of foliage.
8. Persistence of foliage and decorative effect.
9. Moisture requirements.
10. Soil and plant-food requirements.
11. Sun- or shade-loving.
12. Hardiness in a given region.
13. Does the plant spread freely?
14. Best methods of propagation.

In designing a flower-border, one may use only annuals, only hardy perennials or a mixture including possibly some small evergreens or deciduous shrubs as accent plants. A few helpful suggestions are offered to the beginner:

1. Always use enough plants in a mass or group to give a decided effect. Single specimens lose their individuality.
2. Never hide dwarf plants with tall ones.

FIG. 6.—Above, flower-gardens need not be large to be attractive. Below, for backgrounds, lattice fences show innumerable possibilities.

3. The height of the plants used in a border depends on its width. Tall plants should only be used in wide borders.

4. Flowers should be in bloom at all times in the garden, but not all in one place.

5. Plants should be suited to the location, giving consideration to sun, shade, and moisture conditions.

COLOR IN THE GARDEN

Every flower-garden has color, but the arrangement is not always pleasing. This cannot be blamed on ugly colors, for there are no such colors. Ugliness in one color is due to an unhappy combination with another not suited to it. If it were possible to separate the two, all would be peace and harmony. In the garden, so-called color clashes are avoided by wise planning and selection before planting. The wise designer will prescribe only the best seeds and plants obtainable and avoid using untried novelties no matter how highly the catalogue praises them.

The usual color principles, with certain reservations, can be applied to the flower-garden. In the first place it must be taken for granted that green is nature's dominant color and should be employed freely. Shrubs and foliage plants are the proper background for flowers and as such accentuate their color. Green foliage may be a happy peace-maker when neighboring flowers threaten to quarrel. White and gray never clash with other colors, but they must not be over-emphasized. If any color requires the use of the soft pedal, it is red. A little of it goes a long way. It is nature faking to plant huge masses of red cannas, geraniums, and salvias in round beds in the front yard. They do not grow that way in their natural state. Orange and yellow must also be

FIG. 7.—Bird baths add a note of interest to the flower-garden.

classed as warm colors. In a small garden they should be used sparingly and more space given to the cold retiring colors as blue, violet, lavender, and purple.

Strictly speaking, in a perennial garden the color scheme is constantly changing because most perennials have a comparatively short season of bloom. Most annuals bloom throughout the season and consequently the border or garden retains a uniform complexion all summer.

COLOR COMBINATIONS

1. *Use of a single color*

With a proper setting, as in front of a shrub-border or lattice fence, large clumps of a single-colored flower will add a charming note to the garden requiring dignified treatment. Peonies, iris, oriental poppies, and others equally brilliant respond to this simple treatment.

2. *Tints and shades*

Fortunately, most flower colors are either tints or shades of one of the fundamental colors as red, yellow, blue, orange, or violet. The lighter the tints, the more beautiful is the blending when arranged in combinations. The same is true of shades which, although not as popular as tints, nevertheless should be used here and there for emphasis, or to strengthen the ensemble. Newer varieties of roses, gladioli, dahlias, lilies, peonies, and iris are outstanding in color value.

3. *Variations of a single color*

This idea features one color or variations of the same in an entire border or small garden. With annual flowers as the chief feature, the slate can be wiped clean each

FIG. 8.—Above, the yucca is primarily an accent plant. Below, an example of pronounced contrast, white Shasta daisies and blue veronica.

year and a new color scheme may then be experimented with, as a "blue garden" or a "pink garden" or a "yellow garden." Monotony is banished when various tones of the chosen color are brightened up with an occasional bit of white.

4. *Color contrasts* (Fig. 8)

Pronounced contrasts are always delightful, as dark blue larkspur and white Madonna lily, scarlet phlox and dusty miller, sweet alyssum and purple petunia. Contrasts not quite so decided result from the use of complementary colors, as red and green, orange and blue, and yellow and violet (Fig. 9). Some definite suggestions of complementary combinations might include the following:

Orange calendula and blue ageratum.
Native purple asters and goldenrod.
Yellow pansies and violet pansies.
Orange African marigold and blue cornflower.
Purple petunia and yellow annual coreopsis.
Blue speedwell and yellow perennial coreopsis.

5. *Mixed colors*

The charm of an old-fashioned garden lies in the riot of color. The secret of success with a color mixture is selecting an equal quantity of each color. No one color should dominate the situation. After all, nature is the best teacher in the art of plant arrangement. It is well to copy her examples but not to fake them.

FIG. 9.—A corner in a blue border, dwarf blue aster and baptisia.

CHAPTER III

OUTDOOR FLOWER-GROWING

The care and management of a flower-garden sooner or later falls to the lot of most home-owners. The recent era of war gardens can in part be held responsible for the large number of horticultural converts. Gardening is rapidly becoming a definite experience in the lives of many Americans. It is a sound form of recreation and brings pleasure not only to the gardener, but to other members of the household and friends. To some persons the care of plants is second nature and, therefore, extremely easy. Others who are unacquainted with the habits of plants may encounter numerous difficulties as the season advances. First-hand experience is a good teacher, but those who have access to helpful suggestions will be able to save time and the trouble of unnecessary mistakes. Some of the fundamental requirements of flower-growing in the home-garden are herewith set forth.

GARDEN SOILS

The commercial grower of cut-flowers, as a rule, makes a careful selection of a garden site as he must produce quality stock in sufficient quantity to make the venture profitable. The home-gardener who cultivates plants for the love of the flowers usually has no choice as to type and quality of soil in the garden area. If all or part of

the soil is extremely poor, it may be necessary to remove the upper ten or twelve inches and replace the same with a good compost. This is rather expensive if the area is large, but the cheapest remedy in the end.

Oftentimes impoverished soils may be built up gradually by a definite program of fertility. Very light sandy soils respond to repeated applications of humus or organic matter. Stable-manure, leaf-mold, and commercial humus are some of the ingredients that will add body and moisture-holding capacity. Every garden should have a compost pile. Here plant refuse of all kinds, weeds from the garden, lawn clippings, straw, corn-stalks, manure, or anything that will decompose are broken down to a state resembling rich black soil. Commercial preparations which hasten this decomposition of the compost pile are now on the market. Leaf-mold, which is also spoken of as forest soil, is a good soil-builder. It may be prepared cheaply at home by the simple process of placing the annual harvest of dry leaves in a pit and waiting a year or two for them to decay. This decomposition is hastened if the leaves are soaked with water before tramping them down in the pit.

Heavy clay or silt soils that bake hard on drying also need this organic matter, but the quickest way to lighten an extremely heavy soil is to add sand or small quantities of sifted coal-ashes. This is put on in addition to the leaf-mold or well-rotted stable-manure. Good drainage of the garden area is likewise very essential. Soil should have moisture-holding capacity, but should never be continuously wet or soggy. As the rank and file of garden flowers thrive on a diversity of soil types, an abundance of plant material may be found to meet the needs of the average flower-grower. Where special soil types are

required, attention will be called to these requisites in subsequent discussions of the various garden plants.

FERTILIZERS

In order to maintain high fertility over a long period of years, it is necessary to consider drainage, crop rotation, tillage, organic matter, use of limestone, fertilizers, and irrigation. Soil is not merely a mixture of dead particles of mineral matter, but is full of live organisms. Some of these are classified as plant life; others as animals. Under normal conditions most of these organisms are beneficial to plant life. Bacteria and fungi comprise the bulk of this crop. Experiments have shown that beneficial soil bacteria are found in greatest numbers in the upper eight inches of soil. The presence of manure in the soil also increases their numbers.

The chief value of bacteria and fungi lies in the fact that they are able to change vegetable and mineral matter in the soil and make it available for plant use. Plant-food in the form of chemical elements is removed and entirely lost from the soil in various ways. Leaching, evaporation into the air in the form of gases, and removal by the plants themselves are noteworthy examples of this. Good cultivation, then, demands that plants have a constant supply of nourishment at their disposal in the soil. Plant life depends largely on ten chemical elements to supply the food needed in the growth processes. These elements are carbon, hydrogen, oxygen, phosphorus, potassium, nitrogen, sulfur, calcium, iron, and magnesium. All of these, with the exception of nitrogen, phosphorus, and potassium, are supplied by nature in ample quantities in the soil and air surround-

ing the plants. The problem of soil fertility, then, resolves itself into a study of how much nitrogen, phosphorus, and potassium should be applied in the form of fertilizers to a given soil to secure maximum growth.

Stable-manure is a complete fertilizer in that it contains some of all three of the important elements mentioned above. Furthermore, it adds considerable organic matter to the soil and helps to keep it in a loose friable condition. If applied to the soil before the spring planting, the manure should be well decomposed. It is better to plow or spade fresh manure into the soil in the fall of the year so as to allow ample time for decomposition. The universal scarcity of stable-manure for use in flower-gardens has forced the successful gardener to look elsewhere for the essential plant-food elements.

So-called chemical or commercial fertilizers are now used to supplement the manure supply or to replace it entirely. There are many satisfactory compounds on the market which the home-gardener may use with absolute safety to the plants. For the sake of economy, it is best to buy the ingredients separately and mix them at home before applying to the soil.

Commercial fertilizers are more concentrated than animal manures and, therefore, should not be applied too freely. An overdose may cause an abnormal vegetative development or may even burn the young roots. In order to use all the available plant-food these fertilizers should be applied to the soil after spading and before raking. If the proper amount is applied there is no danger of injury, providing the soil is moderately moist and full of organic matter. For specific soil treatment or advice on the use of lime, it is suggested that the

TABLE I

COMMERCIAL FERTILIZERS SUITABLE FOR FLOWER-GARDENS

Fertilizers	*Adds to the soil*	*Amount per square yd.*	*Remarks*
Sodium nitrate	Nitrogen	1 oz.	May be applied also in liquid form. Two teaspoonsful in 3 gals. of water applied as a watering.
Ammonium sulfate	Nitrogen	1 oz.	In liquid form apply as nitrate of soda.
Dried blood	Nitrogen	2 oz.	Dry form only.
Bone-meal	Phosphorus Nitrogen	¼ lb.	Dry form only.
Acid phosphate	Phosphorus	¼ lb.	
Wood-ashes	Potassium	¼ lb.	Use unleeched ashes.
Potassium sulfate	Potassium	2 oz.	

nearest state experiment station be consulted. This is necessary, due to the fact that soil conditions vary so widely throughout the country.

PLANTING THE GARDEN

Spring is the busy season for the flower-grower because it means planting time for the bulk of the material. In most localities, annuals, tender perennials, most hardy perennials, summer-flowering bulbs, and roses are best set out at this season. Mid-summer is a good time to start hardy perennials from seed, while the autumn months bring on the planting of spring-flowering bulbs and some hardy herbaceous material, chiefly iris and peonies. With the possible exception of gardens devoted

entirely to annuals, it will require several years to bring a given area to a state of perfection. So the planting operation continues to be an important factor in flower-gardening.

The following planting hints may be useful:

1. Use only high-grade seeds, bulbs or plants, as the best are none too good for the discriminating flower-grower.

2. Named varieties of flowers that have established a reputation over a period of years are usually more satisfactory than mixed or stock of unknown origin.

3. Adapt your schedule to the requirements of the plants in question. Spring planting of certain perennials may be the cause of complete failure. With other plants the reverse is true.

4. With hardy perennials, it is best to use field-grown plants produced by a reliable nurseryman. For early bloom, greenhouse-grown annuals and tender perennials are recommended. Both pot-grown plants and those in flats are satisfactory, providing they are stocky and free from diseases and insects.

5. Soil preparation before planting is of primary importance. This should consist of deep spading, followed by thorough raking to break up clods and to assist in the removal of stones and other coarse material that might interfere with subsequent tillage.

6. Never plant when the soil is too dry or too wet. However, a moderate amount of moisture at the roots is essential at all times.

CHAPTER IV

CARE AND MAINTENANCE OF THE GARDEN

If a garden is worth planning and planting, it is certainly of enough value to the owner to deserve good care at all times. This is the test of a real gardener and only those with a genuine love for flowers can measure up to the severe standards set by nature and those who have correctly followed her example. A good flower-garden means a lot of hard work and constant watchfulness. Persons of sufficient means to hire the work done may boast of their vast plantings, but they cannot enjoy the thrills that go with first-hand gardening. A small area well cared for is far better than a huge estate overgrown with weeds and otherwise showing signs of neglect. One should find out how far he can go with money and time and then have a garden that is at least finished.

PROPAGATION OF GARDEN FLOWERS

(Figs. 10-13)

Knowledge of how the various garden flowering plants may be reproduced should be of interest and value to all who are responsible for the care of a garden. This knowledge not only throws more light on the proper cultivation of the plants concerned, but also enables the gardener to increase his stock of plants at a reasonable cost.

Seeds

In flower-growing, as in vegetable-gardening, seeds play an important rôle. It is the only way in which some flowering species may be reproduced and plants from seed usually have an abundance of vigor and good growing habits. The economy in the use of seeds cannot

FIG. 10.—Seedlings of hardy perennials at home in a coldframe.

be questioned as practically all annuals and many hardy herbaceous perennials are propagated in this manner.

Sowing seeds in pots and boxes is also practiced in the indoor cultivation of flowers and detailed instructions are given in Chapter XIII.

The difficulty encountered in the transplanting of certain annuals is sufficient cause to sow the seed where the plants are to flower. The proper depth of planting seems to worry all amateurs and it is of sufficient importance to merit definite explanation. Very few flower

seeds are covered more than one inch. Deep planting is essential for large seeds as castor-beans, sweet peas, lupines and nasturtiums. Most seeds are not to be covered more than one-half inch and very small seeds, as petunia and snapdragon, should have only the slightest covering. The essential is to keep the soil about the

FIG. 11.—A cheese-cloth screen protects young plants.

seed moist at all times. This is more difficult late in the season, when hot dry weather is the rule. Partial shade made by covering planted seeds with lath or cloth screen will assist in overcoming the effect of the extreme heat. Shaded coldframes are ideal for summer seed sowing and, therefore, highly recommended for the propagation of hardy perennials.

Propagation by division

The seed method of propagation just described is the

simplest and most natural way of increasing plant stock. However, it is not always adequate with the finest types of garden flowers, because the seed of these highly hybridized varieties will not produce plants like the parents. All the popular varieties of peonies, iris, roses, tulips, and others must then be reproduced by using a

FIG. 12.—Lath screens are useful when starting plants from seed in hot weather.

part of the parent plant. This is called asexual reproduction and is accomplished in various ways.

Suckers.—Certain species of roses and lilacs send up young shoots from the base. These shoots are suckers and if carefully removed may be transplanted to another location. Spring is the ideal time for this operation.

Layering.—Only a few garden flowers belong to the hardwood class of plants. Roses are an example of this type. The layering method of reproduction is a popular way of propagating the climbing type of rose. A cane or shoot of last year's growth is bent down and a node

or two covered with soil. Rooting is hastened if the part of the cane covered with soil is cut with a sharp knife and the slit kept open with a pebble or small stick. The young plants may be moved in the fall or the following spring.

Division.—Perhaps the easiest method of propagating most perennials is to cut the main crowns into a number of pieces. A sharp spade is the usual implement, but a

FIG. 13.—Flower seedlings in thumb-pots plunged in the soil of a coldframe to maintain uniform moisture.

large knife will do. Iris and peonies should be divided in the fall, most other perennials in autumn or early spring before growth starts.

Specialized buds.—Bulbs, corms, and tubers are specialized buds provided with stored-up plant-food capable of carrying the plant through adverse growth conditions, as prolonged drought or a long winter season. A true bulb is made up of layers of starchy tissue, as an onion, or layers of overlapping scales, as the true lily. A corm does not have layers of tissue, but is solid throughout. The gladiolus corm is the most common

example. Bulbels, bulblets, and cormels are very small bulbs or corms that have not reached blooming size. In the case of hardy bulbs, as the narcissus or tulip, the small bulbs gradually increase in size over a period of several years. Small bulbs or corms of tender perennials, as the gladiolus, must be dug in the fall, stored in a frost-proof place, and replanted the next year. Detailed methods of handling the various bulbous plants will be discussed in the chapter on bulbs.

Tubers.—The enlarged storage organ of the dahlia is spoken of as a tuber. See chapter on bulbs for specific information.

Cuttings.—Many house-plants are reproduced by rooting slips or cuttings in sand and the methods explained in Chapter XIV are sometimes applied to garden flowers. Softwood cuttings are easily made of the following perennials: Arabis, cerastium, chrysanthemum, eupatorium, heuchera, iberis, larkspur, loosestrife, phlox, pink, and sunflower. These cuttings should be made in the spring, when the plants are about six inches tall.

INSECT AND DISEASE CONTROL

One of the best recommendations for any plant is that it is free from attacks of insects and diseases. Such species and varieties are rare indeed. The experienced gardener expects pests of all kinds and is prepared to fight them at all times. Sensible pest control in the flower-garden requires a careful diagnosis of the trouble and correct control measures. The beginner is greatly confused by the many kinds of bugs and diseases and by the equally big array of sprays, dusts, and chemicals to fight them. A brief but careful study of the pests usually encountered in the backyard garden will be suffi-

cient to encourage those who have heretofore been baffled by flower enemies.

Practically all garden insects are either chewing or sucking in their eating habits. Chewing insects have biting mouth-parts and actually eat the foliage and tender stems of the plant. All caterpillars and so-called worms are guilty of this type of attack. When only a few insects are present, hand-picking is the quickest way to get rid of them. In the event of a general attack, spraying the plant with an arsenical poison, as arsenate of lead or paris green, is the best remedy. Cutworms are chewing insects that spraying will not control. Poisoned bran mash is effective if applied in advance of transplanting small seedlings. The placing of a paper collar about the stem of young plants is another precaution against the ferocious cutworm.

Plant-lice are examples of sucking insects. Their long pointed mouth-parts puncture the skin of the leaf and extract the juices of the plant. Poison as prescribed for chewing insects is of no avail and a strong contact insecticide must be used. Tobacco and soap solutions are the common remedy. Some of the newer oil sprays are also useful in ridding plants of lice, red-spider, white-fly, and similar sucking insects. All modern insecticides and fungicides have full directions given on the container.

Diseases of plants, as in animals, are caused by definite organisms as fungi and bacteria or by abnormal growing conditions. Prevention is far better than a cure, as the latter is usually too late to be effective. Assuming that prevention of diseases is the logical procedure, the following are useful precautions:

1. Use of protective sprays or dusts on plants that are usually infected, as roses and phlox. Bordeaux mix-

ture is the standard fungicide. Powdered sulfur applied as a dust is also good. A recent recommendation for roses calls for nine parts dusting sulfur, one part arsenate of lead and one part tobacco dust. Plants dusted with this mixture about once every ten days should be kept free from such diseases as mildew, rust, leaf-spot, and such insects as plant-lice and the various leaf-eaters.

2. Burning of diseased plants, whole or portions thereof. This is a precaution against further spreading of diseases that cannot be checked by spraying or dusting.

3. Careful examination of newly purchased stock. As a forethought this is especially important with bulbous plants as lilies, gladioli, and iris.

4. Crop rotation and sanitary growing conditions are very important factors in the control of garden diseases. Bulbs, annuals, and tender perennials that are set out each year should be given a new location in the garden every season.

5. Control of insect pests. As more experimental data become available, the relation between insect attacks and plant diseases is shown. Leaf-hoppers, plant-lice, and other insects are now known to be carriers of specific diseases as aster yellows, dahlia stunt disease, and others. Complete insect control is, therefore, a long step in the direction of disease-free plants.

6. Use of resistant varieties. Plant pathologists, plant-breeders and florists are looking forward to the selection and breeding of certain varieties naturally resistant to serious diseases not easily managed by ordinary spray treatment. This may be the solution of the troubles encountered with the China aster and snap-

dragon. Until such varieties are on the market, gardeners should avoid using kinds that are known to be easily susceptible.

GARDEN EQUIPMENT AND CARE

The essential and indispensable garden tools are spade, hoe, and rake. Other equipment that will make the work easier should include trowel, weeders, planting line, pruning-shears, pruning-knife, hedge-shears, labels, watering-pot, plant stakes, hand-sprayer and hand-duster. Garden equipment need not be fancy in price or appearance, but one should insist on good quality. The style of tool is optional and modern manufacturers have provided a wide selection. Spray materials, fertilizers, and seeds belong to the equipment list and the supply should always be complete to take care of any emergency.

Weeding

Weeds have no place in the flower-garden as they spoil its appearance, rob the plants of much-needed moisture and plant-food, and may by their presence actually lower the quality of the flowers. Removing them promptly with the hand, hoe, or garden cultivator is an obvious duty.

Thinning

Annuals that must be sown where the plants are to flower require thinning of the young seedlings. This process seems so drastic and wasteful to the novice that it is not always carried out. Thinning is made easier if the process is spread over two or even three operations. Thin seeding also helps in the proper spacing of the plants to provide room for each individual.

Staking

Fortunately only a few garden flowers require staking for support. Tall asters, delphinium, dahlias, and boltonias are benefited by this attention. Stakes in the cut-flower garden add to neat appearance by keeping the plants from sprawling over the ground. In the ornamental border, however, stakes may not be so welcome as they detract from the natural habit of the plants. A good garden stake should be strong enough to support the plant, but as inconspicuous as possible. Green is a desirable color. Neat plant supports may be made out of wood or metal. Reinforcing iron cut into suitable lengths will last a lifetime. Twine for tying plants should also be inconspicuous, stout, and soft in texture. Such qualities are found in jute twine or moistened raffia.

Watering

Frequent light watering or sprinkling is usually more harmful than beneficial. Any sprinkling device that will apply water gently but uniformly to the soil surface may be used for watering. The main precaution is to put enough water on the soil to last at least ten days or two weeks. A heavy application may be considered the equivalent of one-half inch of rainfall and it would require the average sprinkler at least one-half hour of uninterrupted application. Light sprinkling of the foliage to counteract red-spider on phlox and roses serves a good purpose, but this is not to be compared to thorough watering. Cultivation of the soil is the final step in correct irrigation.

Mulching

The main purpose of a mulch is to conserve soil-

moisture and to keep the roots cool during extremely hot weather. Stable-manure, straw, marsh-hay, lawn clippings, peat-moss, and dry leaves are suitable materials for mulching. Frequent light stirring of the soil preserves a dust mulch. Stable-manure, especially when well-decayed, is an excellent soil cover as it contains available plant-food. Mulches are usually applied at the beginning of hot weather.

Pruning

Successful rose culture depends largely on scientific pruning of the bushes. This subject is discussed in the separate chapter on roses. Dahlias likewise respond to intelligent pruning, yet with other flowers pruning is of lesser importance, consisting largely of pinching back young plants to encourage branching. Also removal of seed-pods, wilted blossoms, and dead foliage would come under the category of pruning as well as being helpful in keeping up appearances in the garden.

CHAPTER V

ANNUALS

ANNUALS as a group are so-called because they must be planted each year from seed, as their life cycle is entirely completed during one growing season. True enough, some of the hardiest ones, as petunias, bachelor buttons and poppies, come up each year from self-sown seed produced at the end of the growing season. Practical flower-growers also include several perennials which bloom the first year from seed with the annuals, as their cultivation is exactly the same. Examples of this are antirrhimum, *Penstemon gloxinoides,* and physalis or Chinese lantern-plant. In the average seed catalogue annual flowers occupy a very prominent place because they are perhaps better known to the average home-gardener than other types of plants. It must be admitted that they are old-fashioned, but they have never lost their popularity and perhaps never will for the following reasons:

1. The low cost of annuals has a universal appeal. It is surprising what a remarkable effect can be secured by the intelligent use of a few packets of flower seeds.

2. Continuous bloom from early summer until fall is a requirement that nearly all annuals can meet. Garden maintenance is reduced to a minimum and one can depend on an uninterrupted display of color.

3. Annuals for the most part are easy to grow. The

novelty of buying seeds in neat packets and the actual planting of them is only surpassed by the thrill of watching them develop from tiny seedlings to mature blooming plants.

4. The list of special uses to which annuals are adapted is a long one. They are suitable for beds in the formal garden, borders in the informal garden, for quick effects where it is impractical to wait for perennials or shrubbery, for cut-flower arrangements if the kinds with long stems are selected, for hanging-baskets, pots of flowers and porch-boxes.

Mention has already been made of the ease with which annuals may be grown. Anyone can succeed with certain kinds but unless special care is given in the cultivation program complete success is not always assured. A few hints may be helpful.

Better results with annuals are secured if seed is always purchased from reliable companies. Saving seeds in the home-garden is only recommended for species of annuals that come absolutely true from seed each year. Large flowers in improved colors are the results of years of patient hybridizing and selection on the part of experts employed by seedsmen. The seeds are grown on soil and in climates especially adapted to each species. Volume production makes it possible for the seed companies to retail the best quality seeds at very reasonable prices. It also pays to order flower seeds in separate colors or by variety if they are so listed. Packets of mixed seeds rarely give satisfaction. This also refers to mixed colors of the same kind of flower. If a mixture is desired, one can purchase small packets of various choice colors and mix them at planting time. Undoubtedly many of the novelties listed in all seed catalogues

are very meritorious, but until the gardener is sure of his ground it is safer not to use so-called novelties in the ornamental garden. As a matter of interest one may try out a few sorts in a special plot in the vegetable- or cut-flower garden. If they live up to their reputation another season will undoubtedly find them in the choice ornamental section of the home grounds.

CULTURAL REQUIREMENTS OF ANNUALS

It is necessary to make these directions rather general as plants vary so in their specific requirements. When extra precautions are essential mention of them will be made in the individual discussion allotted to each of the annuals. Soil preparation, planting, and garden care has been explained in Chapters III and IV. Directions for planting the seeds in flats for early house culture or in hotbeds and coldframes are given in the chapters on "Indoor Flower-Growing" and "Care of House-Plants." The same methods should be used for starting annuals indoors to be transplanted to the garden for extra early bloom. The average home-gardener is not equipped to grow young seedlings in the house, greenhouse, or hotbed. This means that in most cases the seeds of annuals are started in the open border or flower-bed. After carefully spading and raking the soil, the area given over to each packet of seed may be marked off with the end of a hoe handle or blunt stick. Some gardeners prefer sowing the seeds broadcast, but this method has its disadvantages in that it is difficult to differentiate between flower seedlings and young weeds when they all come up together. This may be overcome by planting the seed in parallel rows throughout the area. The rows are marked with the hoe handle and should be of the

proper depth for the seed to be planted. Spacing the rows the same distance as required by the mature plants will eliminate thinning except for plants in the row. In planting zinnia seed, for example, the rows should be spaced about eighteen inches apart. When the seedlings are large enough to thin, one strong plant should be left about every eighteen inches in the row. The final result will show the plants well spaced for proper development.

CHINA ASTER

Family, Compositæ; Genus, *Callistephus;* Species, *chinensis.*[1]

The China or common garden aster has probably been in cultivation as long as any other annual. Cultivated in China hundreds of years ago, it was introduced into Europe about 1731 and into America about one hundred years later. The many colors and variation in petalage caused this flower to be the most popular annual for bedding, border planting, and commercial cut-flowers. Its present status is not so secure, as heavy attacks of insects and diseases have placed it on the black list with many growers.

For early bloom the seed must be started in flats under glass during March or early in April. The seedlings may be transplanted to other flats or small pots. When the weather is safe for outdoor planting, the young plants should be again transplanted to the garden. For late bloom the seeds are sown directly in the garden where the plants are to flower or they may be transplanted

[1] Insofar as possible all plant names used in this book are in accord with "Standardized Plant Names" published in 1923 by the American Joint Committee on Horticultural Nomenclature; the Latin names are conformed to Bailey's "Manual of Cultivated Plants."

when large enough. Observations seem to indicate that plants grown from seed in the open ground and not transplanted are more resistant to the various insects and diseases attacking the China aster. These pests are so common that special mention of them should be made together with a remedy if such is known.

Insects

Root-aphis are bluish colored plant-lice found on the roots. Rotating the garden crops from year to year is helpful but not always effective. Soaking the soil with a solution made by boiling tobacco stems and keeping the soil around the base of the plant covered with tobacco stems is the favorite precaution. In case of very severe attacks by root-aphis, the carbon bisulfid treatment is recommended. Holes are made in the soil with a stick at intervals of about twelve inches, about a teaspoonful of carbon bisulfid poured into each opening and covered with soil. The soil must be kept moist to confine the gas fumes.

For cutworms poisoned bait or paper collars are placed around the stem of the plant.

Blister beetle, also called aster beetle, is a chewing insect about one-half inch long and black in color. The plants should be sprayed heavily with arsenate of lead.

Diseases

Fusarium wilt, yellows, rust, and stem-rot are the four major diseases of China asters. Any one of them may be severe enough to cause complete failure. In most of these diseases the organism works within the plant so that a spray applied to the surface of the stems and leaves is of no value. Bordeaux mixture or any other

good fungicide will control rust. If nicotine sulfate is added to the spray it has a tendency to repel leafhoppers, aphis, and other insects that are known to be carriers of yellows and possibly other diseases. The fact that China asters may be grown successfully under cheese-cloth inclosures which prevent insect attacks is proof that the control of insects is a necessary precaution. Present investigations by disease and insect specialists may bring to light ways and means of successfully overcoming the many enemies that stand in the way of good garden asters.

Garden varieties

There are many types of China asters from the plain single daisy-like flower to the full double type resembling chrysanthemums. Seedsmen offer the various types in all colors. Good early types are Queen of the Market, Comet, and Rochester; midseason, Daybreak, Crego, Mikado, and Victoria; late, Late-branching, Astermum, and American Beauty.

PANSY

Family, Violaceæ; Genus, *Viola;* Species, *tricolor.*

As an edging, in beds by themselves, or for planting among tulips and narcissus, pansies will always be favorites in nearly every garden. In spite of their popularity the cultivation of pansies is often misunderstood. They are distinctly cool-season plants and are, therefore, short-lived in climates where hot dry weather prevails.

Spring sowing is advisable for home-gardeners who are not equipped to give the young plants winter protection in coldframes. It pays to buy the best seed

obtainable and it should always be fresh. The seed should be planted early, covering lightly with a sandy soil. As soon as the seedlings are large enough to handle they should be transplanted where they are to bloom. The flowers should be picked frequently to keep the plants active. The use of a hotbed or coldframe is advisable for earlier bloom. The largest and earliest flowers are produced on plants grown from seed started the previous summer. Such plants are usually purchased at a nominal sum, but may be produced successfully at home if one has a coldframe. The latter part of August is a good time to sow the seed. Shading and careful watering are required for pansy seed germination during hot weather. The seedlings when large enough are transplanted to a coldframe, setting them 4 inches apart each way. Proper winter protection provides a covering of straw or dry leaves after the ground is frozen. Hotbed sash and boards make up the final covering. In the spring the plants should be uncovered gradually to harden them off. They are then ready for garden use. A partly shaded location just suits them and adds many days to their period of usefulness.

GLOXINIA PENSTEMON (Fig. 14)

Family, Scrophulariaceæ; Genus, *Penstemon;* Species, *gloxinoides;* Variety, Sensation.

Although this penstemon is a perennial, it is easily grown as an annual. In this respect it is identical with the snapdragon or antirrhinum, which it resembles. The flowers of the gloxinia penstemon are large, tubular or bell-shaped, produced in magnificent spikes. The plants are constantly in bloom from June until frost. Pink, red, and lavender are the predominant colors. White-

throated specimens are common and they remind one of the foxglove. With the one exception of fragrance, the gloxinia penstemon has all the good characteristics of the snapdragon. It is not subject to insects and diseases and for this reason should be more commonly grown in addition to or as a substitute for the snapdragon where the latter is eliminated by the rust disease.

FIG. 14.—*Penstemon gloxinoides*, variety Sensation, a noble substitute for snapdragons.

Gloxinia penstemons are easy to grow, but are exacting in one respect, namely that of early planting. As they are rather slow to flower, it is necessary to start the seed not later than February. Young plants may need one or two transplantings before the outdoor garden season begins. Florists would do well to propagate this plant for general bedding and border work. This would enable thosew ho do not have a greenhouse to secure good planting stock.

Named varieties are not as yet on the market. The

FIG. 15.—Above, Rosy Morn petunias are popular as bedding plants. Below, an effective mass planting of Balcony white petunias.

variety Sensation includes various colors which are sold separately or in mixture.

PETUNIAS (Fig. 15)

Family, Solanaceæ; Genus, *Petunia;* Species, *hybrida.*

The petunia is a boon to the flower-lover who is handicapped for time and must depend on a flowering plant that will practically take care of itself. Petunias are not only in evidence in gardens, but their lavish use in window-boxes, hanging-baskets, and as a special adornment of modern filling stations is sufficient testimony of their fool-proof characteristics. They self-sow so readily that one may have petunias year after year with little or no worry. This self-seeding has one drawback, however. The flowers seem to deteriorate in quality of color and texture. A new start with fresh dependable seed is, therefore, strongly recommended.

Petunia seeds are so very small that deep planting will surely interfere with proper germination. Growth is slow at first, so early planting must be insisted on. Seed started in the open ground as soon as the soil is fit to work will provide flowering plants by the middle of July. For June blooming an indoor start is essential. Petunia plants thrive in any soil and under most trying circumstances. After the plants begin to blossom they will continue without interruption until freezing weather.

Varieties [1]

Good bedding sorts.
Snowball—white.

[1] Good seed of double petunias will produce only about 25 per cent of double flowers. Seed is saved from plants grown in pots and hand pollinized. This makes the seed rather expensive.

Rosy Morn—pink with white throat.
Blue Bird—steel blue.

For window-boxes and hanging-baskets.
Balcony petunias—colors various as white, rose, blue, violet and white and red and white.
Single giant-flowering petunias—fringed and plain petaled in rose, white, purple, scarlet, lavender, crimson. Also blotched and striped.
Double-flowering petunias—all colors in plain petaled or fringed.

SNAPDRAGONS

Family, Scrophulariaceæ; Genus, *Antirrhinum;* Species, *majus.*

Everybody loves the charming snapdragon. The peculiar tubular two-lipped flowers have beauty of color and form enhanced by an unusual fragrance. Garden uses include planting in solid beds, in large masses in the open border, and for cut-flowers. They are good companion plants to the cornflower and nasturtium, but combine beautifully with other annuals or perennials in the mixed border.

The cultivation of snapdragon is simple and the instructions as given for petunias will answer the purpose. The seed is rather slow to germinate and a constant and uniform soil-moisture must be maintained. Plants started indoors or in a hotbed always have the advantage of seed sown in the open ground.

A serious disease of snapdragons commonly known as rust has considerably dampened the ardor of the champions of this flower. It is a fungus trouble that has not completely yielded itself to treatment.

Rotation of crops, burning of diseased specimens, and regular spraying with bordeaux mixture before

the disease gains a foothold are suggested relief measures.

Varieties

The modern seedsman offers a big selection of choice varieties of antirrhinum in many colors. They are usually grouped according to size of plant, viz., dwarf, semi-dwarf, and tall. Height of plant ranges from eight inches to thirty inches under good cultivation.

SWEET PEAS

Family, Leguminosæ; Genus, *Lathyrus;* Species, *odoratus.*

Sweet peas are at their best in climates favored with cool summers, plenty of sunshine, and moderately dry atmosphere. Prolonged spells of exceedingly hot weather typical of the corn-belt area of the United States are not conducive to satisfactory sweet-pea culture. The flowers are grown primarily for cutting and as the plants always need support, it is suggested that they be given space in the vegetable- or cut-flower garden rather than among the annuals and perennials in the ornamental border. Trellises and sundry supports for sweet-pea vines, no matter how neat, will add material beauty to a formal or informal garden layout.

Thorough preparation of the soil and heavy fertility are the first steps in sweet-pea culture. Deep trenching in the fall, preparatory to spring planting, is advisable. A trench about twelve inches wide and eighteen to twenty-four inches deep should be dug. A layer of half-rotted stable-manure (cow-manure preferred) is first placed in the bottom of the trench. The remainder is then filled with good garden soil to which has been

added a little well-rotted manure and bone-meal. In milder climates fall planting is possible, but in the northern tier of states spring planting seems to give the best results. In the latter case, earliness of planting cannot be over-emphasized. Only the highest grade seed of named varieties should be planted. Previous to planting the seed, a furrow about six inches wide and six inches deep is prepared in the trenched area which has been previously described. The seeds are planted two inches apart in the bottom of this furrow and covered with an inch of soil. As the young plants grow the furrow is gradually filled to a level with the remaining soil area. Other important cultural details may briefly be summed up as follows: Provide supports promptly; water freely; mulch the soil with lawn clippings or strawy manure; keep the flowers and seed-pods removed.

Varieties

By far the most attractive varieties of sweet peas belong to the Spencer or butterfly type. The large blossoms have waved petals which accentuate their size. As they may be obtained in all colors the Spencer type of sweet peas has practically superseded the once popular open and hooded types also known as Grandiflora varieties.

ZINNIA

Family, Compositæ; Genus, *Zinnia;* Species, *elegans, Haageana.*

Zinnias or, as they are sometimes called, Youth-and-Old-Age, are criticized for their coarse stiff flowers and glaring colors. To a certain extent these detracting remarks are true of the old-fashioned type, but surely

an acquaintance with the improved modern forms does not create this impression. A wide range of delicate colors includes both tints and shades. Size of flowers varies from tiny buttons less than one-half inch in diameter to huge double forms six and even eight inches across. The zinnia is one of the best garden subjects to recommend to beginners and juvenile gardeners as anyone can succeed with them.

Zinnia seeds are large and germinate readily. The plants are so sturdy that they may be transplanted when in full bloom, but such extreme measures are rarely necessary. Giant varieties grow at least three feet tall and require spacing of about eighteen inches between plants. Ordinary varieties are planted or thinned to stand twelve to fifteen inches apart. Long-stemmed exhibition flowers are produced by the prompt removal of side shoots on each lateral branch. This disbudding process results in fewer but much larger blossoms.

Varieties

Giant-flowered, dahlia-flowered, quilled, and picotee are distinct classes of standard varieties of *Zinnia elegans.* The dahlia-flowered type is deservedly the most popular. Another species, *Z. Haageana,* also catalogued as *Z. mexicana,* is a dwarf form growing only twelve to fifteen inches high. The compact little plants with their tiny blossoms, single, semi-double, and double, are very interesting novelties.

MISCELLANEOUS IMPORTANT ANNUALS

Space will not permit an elaborate dissertation for each of the annual flowers considered important in modern gardens. Cultural principles for most of them are quite simple. The proper time of seed-sowing in the

FIG. 16.—Annual larkspur is particularly effective when garden conditions permit it to self-sow.

outdoor garden is very important, therefore the various genera will be discussed in two groups based on a definite planting schedule.

Group I.—Hardy annuals that may be planted as early as the soil may be prepared [1]

Althæa rosea—Annual Hollyhock. Seedsmen now offer an annual form of hollyhock. Resembles the old biennial form, but is not considered as satisfactory. 5 feet.

Alyssum maritimum (or properly *Lobularia maritima*)—Sweet Alyssum. A dwarf annual best known as an edging plant. The white variety, Little Gem, is a compact form. Variety *lilacinum* is lilac in color. 6 inches.

Calendula officinalis—Pot Marigold. Orange, lemon, and sulfur-tinted varieties of calendula, all free flowering from early summer until frost, may be grown in any good garden soil. Too well known to require lengthy discussion. Readily self-sows. 12 to 18 inches.

Centaurea Cyanus—Cornflower. Bachelor Button, Blue-Bottle, Ragged Sailor and Bluet are other common names often applied to this species. Thrives under any conditions and readily self-sows. Occurs both in single and double flowers in white, pink, blue, mauve, and purple. 18 to 24 inches.

Centaurea imperialis—Royal Sweet Sultan. Not always as reliable as the preceding species. Beautiful fragrant flowers, fine for cutting. White, pink, yellow, lavender, and purple. 18 to 24 inches.

Clarkia elegans—Clarkia. Considered one of the most graceful of all annuals. Seems to thrive better if seed is sown directly where the plants are to flower. Pink, lilac, and white. 2 feet.

Coreopsis Drummondii—Goldenwave Calliopsis. A golden-yellow form of annual coreopsis, fine for cutting, border, planting, and bedding. 18 inches.

[1] All plants that will stand transplanting may also be started earlier than mentioned above if greenhouse, hotbed or coldframe is available.

FIG. 17.—Above, succession plantings of candytuft. Below, arctotis is lovely in the gray section of the border.

Coreopsis tinctoria (*C. elegans, C. marmorata*)—Calliopsis. Flowers variously colored with yellow and mahogany predominating. A taller species than the foregoing. Use in borders in sunny location. 2 to 3 feet.

Cosmos bipinnatus—Cosmos. The feathery foliage and the light airy blossoms of cosmos make a universal appeal. One of the best of the tall border plants for late summer effects. In climates where killing frosts are likely to occur before October 1st only the early varieties can be depended on. Pink, red, and white. 3 to 6 feet.

Delphinium Ajacis and *Consolida*—Larkspur (Fig. 16). The original species *Ajacis* and *Consolida* have been greatly improved by seedsmen. The former are sold as hyacinth-flowered, the other as stock-flowered larkspur. Sow seed early where plants are to bloom. Not easily transplanted. Colors various. 2 to 3 feet.

Dianthus chinensis—China Pink. In selecting annual pinks for the garden, a great array of colors presents itself. Single and double sorts are also available. 12 inches.

Eschscholzia californica—California Poppy. Like other members of the poppy tribe the eschscholzia does not stand transplanting. Thin all seedlings to about eight inches. Orange, lemon, pink, carmine, and cream-white. 12 inches.

Gypsophila elegans—Annual Babys-Breath. Unlike most other annuals, gypsophila does not remain in flower all summer. As it blooms in less than eight weeks from planting, several succession sowings should be made. The dainty white blossoms are welcome additions to bouquets. White and pink. 18 inches.

Iberis amara and *umbellata*—Candytuft (Fig. 17). Candytuft is another short-lived plant and succession planting is necessary to have continuous bloom during the summer. Not easily transplanted. White, lilac, crimson, and carmine. 12 inches.

Kochia scoparia var. *trichophila*—Summer Cypress. Summer cypress, also called Mexican Burning Bush and Belvedere, has a bushy growth, green in summer, brilliant red in autumn. Useful as a temporary hedge. Self-sows readily. 2½ feet.

FIG. 18.—Above, single blooms of opium poppy. Below, cleome or spider-flower.

Lupinus luteus, Hartwegii and *hirsutus*—Lupine. Lupines will not stand transplanting. They also prefer an acid soil. Yellow, blue, red, and white. 24 inches.

Myosotis sylvatica—Forget-Me-Not. All forget-me-nots are cool-loving plants and prefer a little shade and plenty of soil-moisture. Plant very early. Blue. 6 to 12 inches.

Nigella damascena—Love-In-A-Mist. Another common name for nigella is Devil-In-A-Bush and it is appropriate when the plant is in the seed-pod forming stage. Miss Jekyll is the best known variety of Nigella. Blue. 12 to 18 inches.

Papaper Rhœas—Corn Poppy. Shirley poppies are an improved form of the species *Rhœas*. They have hairy green foliage and flowers in delicate tints without a trace of black. Self-sows. Will not stand transplanting. 18 to 24 inches.

Papaver somniferum—Opium Poppy (Fig. 18). A larger type than the preceding. Glaucous gray foliage. Flowers large, single and double, petals plain or deeply cut. Culture same as preceding. 2 to 3 feet.

Phlox Drummondii—Drummond Phlox. The annual phlox is too well known to require detailed description. Excellent in masses for beds or border and as an undergrowth for barer stemmed annuals or when planted among gladioli. Sometimes self-sows. Blooms all season. Colors various. 12 to 18 inches.

Portulaca grandiflora—Rose Moss. An attractive creeping plant with moss-like green leaves largely hidden by flowers. One of the best low-growing annuals for a dry sun-beaten situation. 4 to 6 inches.

Group II.—Annuals that are somewhat tender to cold [1]

Ageratum Houstonianum—Floss-Flower. The dainty

[1] These important garden flowers prefer warm growing conditions so the planting of seed in the open ground should be deferred until there is no longer danger of frost or cold weather. Some species are slow-growing and an early start in hotbed or greenhouse is essential to give them a worth-while blooming season. When this is necessary special mention of the same will be made under the proper heading.

FIG. 19.—Above, single and double annual gaillardia. Below, scabiosas or pincushion-flowers.

feathery heads of blue or white flowers, together with the everblooming habit of the plant, place ageratum in the front rank of bedding material. An early start under glass is essential, otherwise flowering is deferred until late summer. Planting in combination with *Phlox Drummondii, Vinca rosea* or French marigold is suggested. 12 to 18 inches.

Arctotis grandis—Bushy Arctotis (Fig. 17). The white daisy-like blooms have a steel-blue center, hence the other common name of Blue-eyed African Daisy. The flowers close at night, so its use as a cut-flower is limited to daytime. 18 to 24 inches.

Browallia americana (*B. demissa, B. elata*)—Browallia Amethyst. An excellent addition to the blue section of the garden. Blue and white. 18 inches.

Chrysanthemum carinatum (*C. tricolor*)—Annual Chrysanthemum. The so-called summer or annual chrysanthemums are derived from the species *carinatum* and *coronarium*. Yellow and white predominate, but some varieties are striped or ringed with red-maroon or purple. Prolonged hot weather sometimes interferes with flower production. 2 to 3 feet.

Cleome spinosa (*C. gigantea, C. pungens*)—Spider-Flower (Fig. 18). The flowers are well named, as the long-stemmed stamens and pistil provide a spidery outgrowth. Cleome is a good substitute for shrubbery and can be used as an accent plant in small gardens. Pink, lavender, and white. 4 feet.

Dimorphotheca aurantiaca—Orange African Daisy. South Africa contributed this rare and showy daisy to our gardens. Color range from glossy salmon-orange to pale sulfur-yellow. A black central ring accentuates the form of this daisy. 12 inches.

Gaillardia pulchella (*G. picta, G. Lorenziana*)—Annual Gaillardia (Fig. 19). Although smaller than the perennial species, the annual form always gives a good account of itself and is very easy to grow. Long slender stems help to make this a good cut-flower. Double and fancy-petaled forms are catalogued. 18 inches.

Gilia capitata—Globe Gilia (Fig. 20). The globe

gilia deserves a place in any blue border. Feathery foliage. Light blue flowers. Very charming combined with such yellow annuals as coreopsis and African marigold. Plant directly in garden. 2 feet.

Helianthus debilis (*H. cucumerifolius*)—Cucumber-leaved Sunflower. The common sunflower (*Helianthus annuus*) is too coarse for most gardens except where a tall screen planting is necessary. The cucumber-leaved species (*H. debilis*) is dwarf, small-flowered and very refined. There are several varieties. Yellow. 3 to 4 feet.

Fig. 20.—*Gilia capitata,* a blue-flowered annual of merit.

Impatiens Balsamina—Garden Balsam. Combined with alyssum or verbena, garden balsam looks well as a border subject. It is suitable for low hedges on account of the upright habit of the plant. Grows rapidly. Colors white, flesh, salmon, pink, purple, and violet. 18 to 24 inches.

Lavatera trimestris (*L. rosea*) — Herb Tree Mallow (Fig. 21). Although not readily transplanted the annual tree mallow will produce a quick effect from garden-sown seed. The flowers resemble small hollyhocks. Color shrimp-pink. 2½ feet.

Lobelia Erinus—Lobelia. The beautiful dark blue of the lobelia is always admired as it contrasts so well with yellow or white. The variety Crystal Palace Compacta is the best edging sort. Gracilis is a more trailing variety and better adapted to use in hanging-baskets or window-

FIG. 21.—Above, the satiny pink blooms of lavatera resemble small hollyhocks. Below, the old-fashioned four o'clock as a temporary hedge.

boxes. Start indoors for all season bloom. 4 to 6 inches.

Matricaria parthenoides (*M. capensis*)—Feverfew-Chamomile. Compact growing plant covered with small double white button-like flowers suitable for bedding. July until frost if plants are started indoors in March. 12 to 18 inches.

Matthiola incana var. *annua*—Annual Stock. Stocks thrive in moderately cool climates. Early planting

FIG. 22.—The sweet-scented white nicotiana is adapted to moonlight gardens.

seems to increase flower production. Colors various. 12 to 18 inches.

Mirabilis Jalapa—Four O'Clock (Fig. 21). On cloudy days and late afternoons the four o'clocks open their many-colored blossoms. They are bound to attract attention no matter where grown. Humming birds and the big humming-bird moths love to visit these flowers. Another good plant for temporary hedges. 2 to 3 feet.

Nicotiana alata var. *grandiflora* (*Naffinis*)—Flowering Tobacco (Fig. 22). Sweet-scented large white blossoms that open in the evening. Fine for moonlight gardens.

The species *sylvestris* grows about a foot taller than *N. alata*. Readily self-sows, but best started each season under glass. 2 to 3 feet.

Reseda odorata—Mignonette. A good companion to stocks as both are cool-loving annuals and benefit by an early start. The fragrant flowers are not striking but are charming in mixed bouquets. White, green, red and yellow combined. 12 to 18 inches.

Ricinus communis—Castor-Bean. The largest of all annuals and used for tropical effects and as a screen planting. Grown mostly for the beautiful foliage, but the fruit of some varieties is quite interesting and ornamental. Green and bronze. 4 to 12 feet.

Salpiglossis sinuata—Painted Tongue (Fig. 23). Salpiglossis is deserving of much greater attention. The beautifully colored blooms are tinted and veined with gold. Not a robust grower when young so requires more attention than the average. 2½ feet.

Sanvitalia procumbens. A trailing plant with globe-shaped yellow blossoms. Of very easy culture and always in flower. Suitable for edging, low beds or in the rock-garden. 6 inches.

Scabiosa atropurpurea—Pincushion-Flower (Fig. 19). Other names for this old-fashioned garden favorite are Sweet Scabious and Mourning Bride. For cutting, bedding and border work. Continuous bloom. White, pink, scarlet, blue and purple. The variety Azure Fairy is especially attractive. 2 to 3 feet.

Tagetes—Marigold. Popular yellow and orange annuals for beds or borders.

T. erecta is the tall African form.

T. patula, the French marigold, is well adapted to beds or may be used for edging.

T. signata pumila, the Mexican marigold, has star-shaped flowers produced on a very compact bush. 12-30 inches.

Verbena hybrida—Common Verbena. Verbenas have practically the same uses as *Phlox Drummondii*. Partly trailing in habit, they lend themselves to bedding or to furnish ground-cover for lilies and gladioli. All colors. 12 inches.

FIG. 23.—The coloring of salpiglossis is unmatched in other garden annuals.

TABLE II

MISCELLANEOUS ANNUALS

Flowers marked* are best sown where the plan ts are to flower in the garden as they will not transplant readily. All others may be planted outdoors but will bloom earlier and longer if started in a hotbed or window-garden in March or early April.

Botanical Name	*English Name*	*Color*	*Height*	*Flowers*
*Abronia umbellata	Sand-Verbena	Rose	6 in.	All summer
Amaranthus caudatus	Love-Lies-Bleeding	Red	3 to 5 ft.	All summer
Amaranthus cruentus	Princes-Feather	Red, yellow	4 to 5 ft.	All summer
Amaranthus salicifolius (var. of A. tricolor)	Chameleon Amaranth	Red, green, gold	3 ft.	Foliage
Amaranthus tricolor (A. gangeticus)	Josephs Coat	Red, yellow	2 ft.	Foliage
*Anagallis linifolia	Pimpernel	Rose-purple	6 in.	July-Aug.
*Anchusa capensis	Cape Bugloss	Blue	2 ft.	All summer
*Argemone grandiflora	Prickly Poppy	White	2 ft.	All summer
*Argemone mexicana	Prickly Poppy	Yellow	2-3 ft.	All summer
Asperula orientalis	Woodruff	Blue	1 ft.	July-Aug.
Brachycome iberidifolia	Swan River Daisy	Blue, white, pink	6-12 in.	July-Aug.
Celosia argentea	Feather Cockscomb	Yellow, pink, red	2-3 ft.	All summer
Celosia argentea var. cristata	Common Cockscomb	Yellow, pink, red	1-2 ft.	All summer
Celosia Childsii (form of C. argentea)	Chinese Wool Flower	Red	2-3 ft.	All summer
Chrysanthemum Parthenium var. aureum	Golden Feather	Yellow	8 in.	All summer
Collinsia bicolor	Collinsia	Various	18 in.	Early summer
*Convolvulus tricolor	Dwarf Morning-glory	Various	1 ft.	All summer
Datura Metel (D. fastuosa)	White Angels-Trumpet	White	3 ft.	All summer
Emilia flammea	Tassel-Flower	Orange, scarlet	18-24 in.	Late summer
Euphorbia heterophylla	Painted Spurge	Foliage red	2-3 ft.	Late summer

Euphorbia marginata	Snow-on-the-Mountain	Foliage white	2 ft.	Late summer
Gaura Lindheimeri	White Gaura	Rosy-white	2-3 ft.	Late summer
*Godetia grandiflora	Satin-Flower	Various	12 in.	July-Aug.
Hunnemannia fumariæfolia	Yellow Tulip Poppy	Yellow	2 ft.	Aug.
Leptosyne Stillmanii	Stillman Coreopsis	Yellow	1½ ft.	July-Aug.
Linaria bipartita	Cloven-Lip Toadflax	Various	2 ft.	July-Aug.
Linum grandiflorum	Scarlet Flax	Scarlet	2 ft.	July-Aug.
*Lychnis Cœli-rosa	Rose-of-Heaven	Rose	1 ft.	All summer
Malcomia maritima	Virginian Stock	Lilac, red, white	6-8 in.	July-Aug.
*Mathiola bicornis	Grecian Stock	Lavender	18 in.	All summer
Mentzelia Lindleyi (Bartonia aurea)	Blazing Star	Yellow	1 ft.	July-Aug.
Mesembryanthemum crystallinum	Ice-Plant	Light rose	6 in.	All summer
*Mimosa pudica	Sensitive-Plant	Lavender	1 ft.	All summer
Mimulus luteus	Monkey-Flower	Yellow	6-12 in.	Early summer
Mimulus moschatus	Musk-Plant	Yellow	6 in.	Early summer
Nemophila Menziesii	Baby-Blue-Eyes	Blue	6 in.	July-Aug.
Œnothera acaulis	Dandelion Sundrops	Yellow, blue, white	6-12 in.	July-Aug.
Oxalis rubra or rosea	Rose Oxalis	Rose	6 in.	All summer
Oxalis corniculata	Nasturtium Oxalis	Yellow	3 in.	All summer
Phacelia Whitlavia	Bluebell Phacelia	Blue	1 ft.	July-Aug.
Rudbeckia amplexicaulis	Clasping Coneflower	Yellow	2 ft.	Late summer
Rudbeckia bicolor var. superba	Erfurt Coneflower	Yellow	2 ft.	Late summer
Saponaria Vaccaria	Cow Soapwort	Pink, white	18 in.	July
Silene Armeria	Catchfly	White, pink, red	18 in.	All summer
Trachelium cæruleum	Throatwort	Lavender	18 in.	Late summer
*Trachymene cærulea	Blue Laceflower	Lavender	2-3 ft.	Late summer
*Zea Mays var. japonica	Striped Maize	Green, red, white	4-5 ft.	Late summer

TABLE III

A SUGGESTED LIST OF ANNUAL FLOWERS FOR USE IN DEFINITE COLOR SCHEMES

Key to height of plant

Dwarf — 6 to 15 inches tall
Medium—12 to 24 inches tall
Tall — 2½ to 5 feet.

Annuals for the white border

Dwarf	*Medium*	*Tall*
Sweet alyssum	Eschscholzia	Argemone grandiflora
Ageratum	Ammobium	Cosmos
Candytuft	Arctotis	Nicotiana alata or sylvestris
Gypsophila elegans	Acroclinium	Zinnia
Petunia	Centaurea Cyanus	
Phlox	China aster	Larkspur
Verbena	Annual chrysanthemum	Annual hollyhock
Portulaca	Euphorbia marginata	Datura
Malcomia	Scabiosa	
	Snapdragon	
	Balsam	

Annuals for the pink border

Dwarf	*Medium*	*Tall*
Gypsophila elegans	Saponaria	Cosmos
Petunia	Centaurea Cyanus	Zinnia
Phlox	China aster	Cleome or spider-plant
Verbena	Scabiosa	Lavatera
Dianthus or pinks	Snapdragon	Nicotiana Sanderæ
Portulaca	Celosia	Larkspur
Lychnis	Clarkia	Annual hollyhock
Oxalis rosea	Helichrysum	Zea Mays japonica
Silene	Balsam	
	Poppy	

Annuals for the blue border

(Includes lavender and purple)

Dwarf	*Medium*	*Tall*
Ageratum	Centaurea Cyanus	Larkspur
Asperula	China aster	Ricinus
Browallia elata	Nigella	

TABLE III—(*Continued*)

A SUGGESTED LIST OF ANNUAL FLOWERS FOR USE IN DEFINITE COLOR SCHEMES

Candytuft	Scabiosa
Lobelia	
Nemophila	Statice
Petunia	Balsam
Phacelia	Anchusa
Phlox	Gilia
Swan River daisy	

Annuals for the red border

Dwarf	*Medium*	*Tall*
Linum grandiflorum	Chinese wool-flower	Amaranthus cruentus
Nasturtium	Coxcomb	Amaranthus caudatus
Phlox	China aster	Larkspur
Dianthus or pinks	Poppy	Zinnia
Portulaca	Salpiglossis	Annual hollyhock
Verbena	Salvia splendens	
	Scabiosa	Euphorbia heterophylla
	Snapdragon	

Annuals for the yellow border

(Includes orange)

Dwarf	*Medium*	*Tall*
Calendula	Calliopsis	Sunflower (various)
Sanvitalia	Coxcomb	African marigold
French marigold	Annual chrysanthemum	Zinnia
Dimorphotheca	Annual gaillardia	Argemone mexicana
Nasturtium	Eschscholzia	
Oxalis corniculata	Snapdragon	
	Rudbeckia	

CHAPTER VI

HARDY HERBACEOUS PERENNIALS

The gardens of our grandmothers contained mostly hardy perennials, as peonies, phlox, hollyhocks, larkspur, and bleeding-heart, and they are considered by many persons as old-fashioned flowers. However, these hardy herbaceous plants are able to stand the cold climate of the northern states, and although the tops die down to the ground each winter, new growth is made from the roots in the spring and the plants flower each season. Because of this permanent feature and also because of the great variations in color, height, foliage and type of bloom, these "old-fashioned" flowers are again in style and will probably remain favorites in American gardens for all time.

In a perennial garden the scene changes from week to week as new specimens come into bloom and old ones take their departure. This relieves the monotony common to annual gardens where the same plants continue to bloom from June to frost. Only a few perennials, as the plumy bleeding-heart, some varieties of larkspur, gaillardia, and possibly coreopsis, bloom all season. Once established, the plants increase in beauty year by year. Proper selection and arrangement of perennials will assure one of a continuous change of bloom in the border from early spring until the close of the season.

For an immediate and complete effect it is possible

to plant a perennial border or an entire garden within the period of one year. This will allow for fall planting of such sorts as peony, iris, oriental poppy, and spring planting for the bulk of the kinds called for by the average planting plan. The planting stock should consist of root-divisions of old clumps or young plants propagated from seed or cuttings and grown on in pots or preferably in the nursery row for a year or two. Although the garden of a friend or neighbor occasionally contributes rare and desirable specimens, reliable nurserymen, seedsmen, and some florists are the best sources of perennial plants. The only disadvantage of starting a perennial garden with plants as above described is the cost involved when a great quantity is required. If an immediate effect is not absolutely essential, other methods of providing plant materials may be employed.

Unfortunately the seed method will not prove practical with all perennials, especially with such popular subjects as peonies, iris, and phlox. These old veterans of the garden have been hybridized so many times by plant-breeders in an attempt to improve the varieties that if one should plant the seed the resulting progeny would be a wild mixture of many colors, mostly undesirable. Consequently the best varieties which have stood the test of time are always multiplied by dividing the roots of established plants. This results in flowers just like the original.

There are numerous hardy plants still in the original species form that will come true to type from seed. If the gardener is fortunate enough to have a hotbed or small greenhouse, the seed of perennials may be started as early as February. Some of the seedlings will bloom

the first year if given this extra early start. Without greenhouse facilities seed planting during June and July is advocated. A small packet of seed will usually produce enough plants of a kind for the ordinary home-garden. Starting the seed in a coldframe or protected bed covered with a lath or cheesecloth screen placed about a foot or eighteen inches above the soil provides protection against hot sun, heavy rains, and wind. The soil of the seed-bed is improved by the addition of leaf-mold and a little sand. As soon as the young plants have developed two or three pairs of leaves, they should be transplanted to another part of the coldframe or into a protected bed, where they should remain until early the following spring, when they should be set out in their permanent quarters. The coldframe is most convenient for protecting young plants which are easily killed by erratic and severe winters. A covering of dry leaves or straw over the plants and final covering of sash and boards is all that is necessary.

Spring and autumn planting are both possible, but for peonies, iris, and the oriental poppy early fall is the best time. All other herbaceous perennials may be set out in early spring. In mild climates fall planting is recommended especially for spring-blooming species. As hardy perennials will occupy the border for a number of years, deep spading and incorporating a liberal quantity of well-rotted stable-manure will result in better bloom in the years to follow. The chief precautions in planting are to spread the roots evenly, to firm the soil around them, and to water thoroughly after setting if the soil is at all dry. If plants must be moved in full growth the tops should be partially cut back to reduce the amount of transpiration. Other details of

FIG. 24.—Long-spurred aquilegias or columbine.

cultivation have been previously explained in Chapters III and IV.

Several genera representing the most popular hardy perennials have been selected for special study and consideration. Three of these, namely the chrysanthemum, iris, and the peony, are of such importance that national organizations have been formed to foster their welfare.

COLUMBINE (Fig. 24)

Family Ranunculaceæ; Genus, *Aquilegia;* Species, various.

The aquilegia or columbine, sometimes incorrectly called honeysuckle, is of special interest to American gardeners because so many of the desirable species are native. The plant is a hardy perennial herb with paniculate branches terminated by showy flowers. The latter have five sepals and five petals produced backward between the sepals, forming a hollow spur. The spur is terminated with an enlarged knob. Aquilegias are prominent in perennial collections because of their hardiness, graceful habit of growth, attractive foliage, and beautiful flowers which exhibit a wide range of color.

Important American species of Aquilegia

A. canadensis—Common Wild Columbine. 1-2 feet. Red and yellow. Short spurs. May to July.

A. formosa (*A. californica*)—Californian Columbine. 2 to 3 feet. Red and yellow. Short spurs. May to August.

A. *cærulea*—Colorado Columbine. 1-2 feet. Blue and white. Long spurs. April to July.

A. chrysantha—Golden Columbine. 3 feet. Showy, fragrant, golden-yellow flowers. Long spurs. May to August.

Introduced species of Aquilegia

A. vulgaris—European Columbine. 3-4 feet. Colors white, blue, red and purple. Short spurs.

A. alpina—Alpine Columbine. 1 foot. Blue and white, similar to *A. cærulea*. Long spurs. Good for rock-gardens.

A. Skinneri—Mexican Columbine. 3 feet. Showy flowers, greenish-orange and bright red. Long spurs. May to June.

A. viridiflora—Green Columbine. 1-1½ feet. Curious green flowers.

A. longissima. Extra long spurs. Grown as a novelty.

The above species are all perennial, but *A. cærulea* and *A. vulgaris* respond best if treated as biennials. In addition to the true species, several strains of hybrids have been developed. The most famous of these are sold as "Long-Spurred hybrids." Pink, blue, and yellow are the colors most desired.

Propagation and cultivation

True perennial species are easily propagated by dividing the roots of established clumps in spring or fall. All species and the newer hybrid sorts may be grown from seed which sometimes develop blooming plants the first year if started very early in the greenhouse. The usual culture is to start the seed in frames in the spring or in early summer for bloom the second year.

Aquilegias prefer a light sandy loam, rich in plant-food. Older plants, if properly established, will thrive in heavier soils providing they are well drained. In extremely cold climates a light mulch of strawy manure or dry leaves will be beneficial. Several insects occasionally attack columbine plants. If borers are found in the crown, the only remedy is to pull up the infected

plants and destroy by burning. Another insect, the leaf-miner, tunnels minute passages in the foliage. Forty per cent nicotine sulfate used at the recommended strength for plant-lice will repel the leaf-miner.

HARDY ASTER (Fig. 25)

Family, Compositæ; Genus, *Aster;* Species, various.

Starwort and Michaelmas daisy are other common names applied to native perennial asters. The name

FIG. 25.—For autumn bloom no hardy flowers can compare with native asters.

aster means a star and the masses of bloom are indeed star-like in appearance. This perennial was appreciated by European gardeners long before its true worth was recognized in America. In height and color asters vary greatly and for this reason are well adapted as border subjects for late summer and autumn effects. A few

species bloom early and some dwarf forms, as *A. alpinus* and *A. Amellus* are exceedingly desirable for rock-gardens. Most of the species are native in America. Nurserymen now offer many improved hybrid varieties.

Important species of Aster

A. acris—Blue Starwort. Violet-blue. 2-3 feet. July to August.

A. alpinus—Alpine Aster. Bluish-purple. 6-10 inches. May, June. Rock-gardens. Var. *albus* is a white form.

A. Amellus—Italian Starwort. Purple. 2 feet. July to August. Rock-gardens.

A. cordifolius—Heart-leaved Aster. Lilac. 4 feet. September to October. Suitable for partial shade.

A. ericoides—Heath Aster. White. 2-3 feet. September to October. Dry sunny location best.

A. grandiflorus—Large-flowered Aster. Purple. 3 feet. October to November. Very large blooms borne singly.

A. novæ-angliæ—New England Aster. Violet-purple. 2-6 feet. August to October. Many hybrid varieties.

A. novi-belgii—New York Aster. Lilac or blue. 3-5 feet. August to October. Many hybrid varieties.

A. tataricus—Tartarian Aster. Bluish-violet. 6 feet. October to November. A very late form.

Named hybrid varieties of popular species of Aster

Amellus: King George, Perry's Favorite, Beauty of Ronsdorf, Rudolph Goethe.

Novæ-angliæ: Lil Fardel, roseus, pulchellus, Ryecroft Pink.

Novi-belgii: Climax, St. Egwin, Sam Banham, White Queen, Cloudy Blue.

Miscellaneous hybrids: Abendrote, Beauty of Colwall, Feltham Blue.

Propagation and cultivation

Asters are easily propagated by division of crown in spring or fall.

It would be difficult to find a perennial of easier culture. Every year or two the clumps should be divided. Tall varieties may need staking. Goldenrod is a favorite companion of asters in the border.

CHRYSANTHEMUM

Family, Compositæ; Genus, *Chrysanthemum;* Species, various.

The botanical genus Chrysanthemum includes many important perennials commonly known as daisies. As they vary greatly in cultural requirements, each species will be considered separately.

C. coccineum—Pyrethrum, Painted Daisy

Everywhere this form of daisy is spoken of as pyrethrum. The plants grow two to three feet tall and bloom profusely during June and July. The flowers are pink, white and red, single and double. The pyrethrum is an ideal cut-flower, also excellent for beds and borders. It is very hardy and of easy culture. The plants should be divided and reset every three or four years. It is easily propagated from seed or by division.

C. morifolium (*C. hortorum*)—Garden Chrysanthemums

Hardy chrysanthemums are beloved as autumnal flowers, but in northern territories where early killing frosts are the rule are likely to be a disappointment unless very early varieties are chosen. The protection of a greenhouse is necessary if chryanthemums are to be made a specialty. For garden culture chrysanthe-

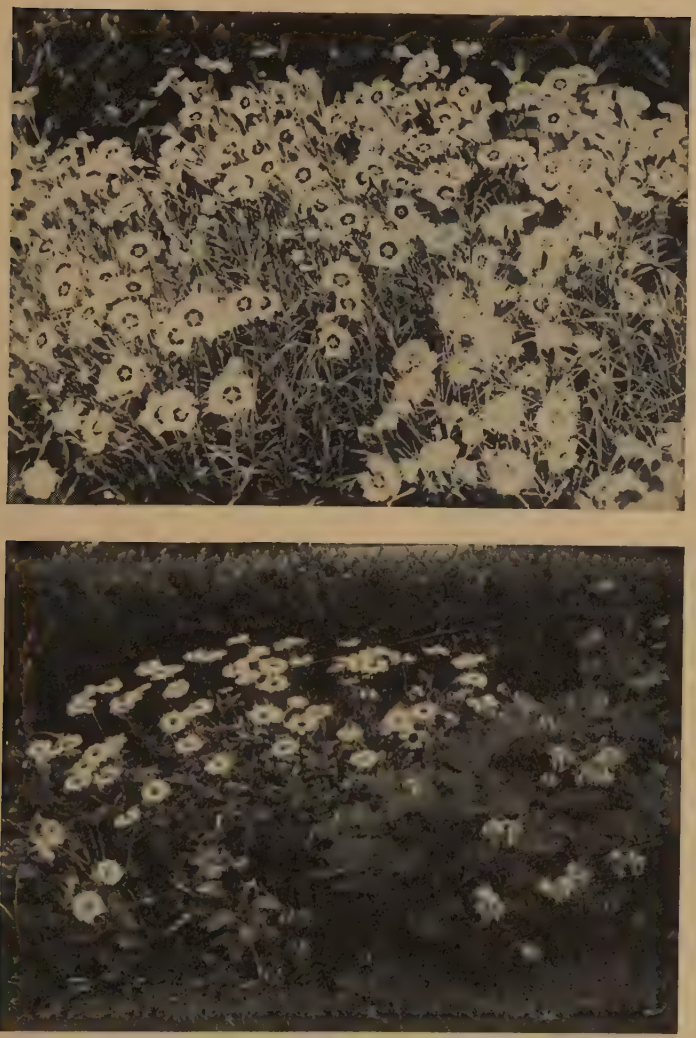

FIG. 26.—Above, *Dianthus plumarius*, Scotch pink. Below, the Shasta daisy.

mums that begin blooming in September are a real boon. A few extra early varieties are Angelo, Carmelita, Cranfordia, Mrs. H. Craig, Normandie, Wolverine and Skibo. For best results the plants are divided and reset early each spring. Cuttings from the first shoots are easily rooted in sand and will make good plants the same season. The blooming season may be prolonged if the plants are grown near a building where a protective covering of cloth may be applied on frosty nights.

C. maximum—Shasta Daisy (Fig. 26)

The late Luther Burbank was largely responsible for popularizing the magnificent white daisy known as the Shasta. The garden forms are classified under the species *C. maximum* and are a great improvement over the common white or ox-eye daisy classified as *C. Leucanthemum*. The newer varieties, as King Edward, Glory of Wayside and Mrs. C. Lowthian Bell, are noted for their large size and great beauty. Flore-pleno is a double form. In the garden Shasta daisies combine beautifully with *Veronica spicata* or blue delphinium. As a cut-flower it is difficult to find their superior. All varieties, especially the named forms, are propagated by division. The seed method is also used. Light mulching during the winter and protection from prolonged dampness is one of the secrets of successful culture. The average height of Shasta daisies is two and one-half feet and they bloom during May, June and July. *C. arcticum* (Arctic daisy) is another white species of distinct value for autumn flowering. It is at its best in September and October. Plants grow about two feet tall and the flowers are two inches in diameter. *C. uliginosum* (*Pyrethrum uliginosum*) is the late-blooming giant

daisy. It blooms in late summer and plants sometimes reach a height of four feet.

LARKSPUR

Family, Ranunculaceæ; Genus, *Delphinium;* Species, *cultorum.*

Horticultural varieties of the perennial delphinium are largely hybrids of *D. elatum, D. cheilanthum,* and *D. grandiflorum.* Blue in various shades is the predominant color; however, the newer varieties include white, pink, and mauve. The species *D. cardinale* and *D. nudicaule* have red spikes, but are not hardy in severe climates. The only yellow species, *D. Zalil,* requires much sun and is considered a difficult subject. Delphiniums are gaining in popularity each year. Their tall stately spikes add a massive touch to the garden. The blue varieties are natural companions to the Madonna lily, coreopsis, Shasta daisy, and other perennials.

Propagation and cultivation

Excellent results may be secured in starting delphinium from seed as a number of the select strains come true. It is safer, however, to propagate fancy named varieties by division of the clump or cuttings taken from young shoots in the spring.

A sunny exposure and a rich soil are requisites in the cultivation of delphinium. At least four square feet should be devoted to each plant of the tall varieties. Dividing old clumps every three or four years renews their vigor. June is the best blooming month, but some varieties, as Belladonna, bloom all summer. If cut back immediately after flowering a second crop of flowering shoots appears in August.

A disease of delphinium known as blight causes the foliage to turn black and the plants fail to bloom. Control measures include substituting bone-meal in place of manure and spraying the foliage with bordeaux mixture or ammoniacal copper carbonate. Dry bordeaux mixture hoed into the crowns of established plants late in the fall with sifted ashes has a tendency to prevent attacks of slugs or snails which feed on the tender shoots in early spring.

Garden varieties and species of delphinium

Amos Perry. Rosy-mauve. 6 feet.
Belladonna. Light blue. 4½ feet.
Capri. Sky-blue. 6 feet.
Formosum. Deep gentian-blue—white eye. 4 feet.
Duke of Conought. Deep blue. 6 feet.
King of Delphiniums. Dark blue. 6 feet.
Moerheimei. White. 6 feet.
Grandiflora (Chinese). Fine foliage. White, pink, blue. 4-6 feet.
Rev. W. Wilkes. Rich purple. 4½ feet.
Bellamosa. Dark blue. 4 feet.

HARDY PINKS

Family, Caryophyllaceæ; Genus, *Dianthus;* Species, various.

The species and hybrid varieties of hardy dianthus provide an interesting array of low-growing plants suitable for edging beds and borders, for use in rockeries, and for a continued supply of cut-flowers. The colors are most brilliant and the spicy fragrance of the blooms of most sorts is an added attraction. All are perennial except the Chinese pinks and Sweet William. These last named types are best treated as biennials and seed should be planted each year for bloom the following

FIG. 27.—The German iris should be planted in bold masses for striking color display.

season. Pinks thrive on a light warm soil which must be well drained. Seeds and division are the common methods of propagation.

Important species of Dianthus

D. Allwoodi—Perpetual-flowering Pink. Large flowers borne on long stems and produced all during the summer. Fragrant. All colors. 1 foot.

D. plumarius—Clove, Scotch, or Grass Pink (Fig. 26). Gray-green foliage, fragrant flowers, white, pink, red, purple. Keep flowers cut to increase blooming season. 1 foot.

D. deltoides—Maiden Pink. Very dwarf trailing form. For edging or rockery. Pink or white. 6 inches.

D. latifolius var. *atrococcineus*—Everblooming Sweet William. Deep crimson flowers produced all summer. Treat as a biennial. 18 inches.

D. barbatus—Sweet William. Large clusters of blossoms produced in great profusion. June and July. All colors. Treat as a biennial. 18 inches.

IRIS (Figs. 27-29)

Family, Iridaceæ; Genus, *Iris;* Species, various.

Botanists have described about two hundred distinct species of Iris, but of these only seven or eight are in common garden use. The European species, *I. germanica,* has given rise to several thousand named varieties of hybrid iris and this type is unquestionably of greatest horticultural interest. The flowers vie with the orchids for beauty of coloring and texture of petals. Many varieties are delicately fragrant. The narrow sword-like leaves add dignity to the plant. The efforts put forth by the members of the American Iris Society have placed the flower on a permanent basis in North America. A study of all the species and varieties is

FIG. 28.—Tulips are excellent companion flowers to iris.

intricate and calls for years of research and experience on the part of specialists. From the average practical garden viewpoint, iris may be divided into three groups, namely: beardless, bearded, and bulbous. A brief classification follows:

Beardless or Apogon iris

I. sibirica—Siberian Iris. Small flowers, blue or white. Slender foliage. 2-3 feet. June.

I. Pseudacorus—Yellow Flag. Large yellow flowers. Leaves longer than flower-stems. May and June. 2-3 feet. May be planted directly in water, but will thrive in ordinary garden location.

I. versicolor—Native Blue Flag. Blue. June. 2 feet. Thrives in a wet situation as well as moderately dry. Fine for water-gardens.

I. lævigata and *I. Kæmpferi*—Japanese Iris. Large flat blooms. Tall slender leaves held erect. June and July. 2-3 feet. Blooms after common German varieties.

Bearded or Pogon iris

I. pumila—Dwarf Iris. Very early. Blue, white. Several hybrid varieties. Good for edging or in rock-garden. 10 inches. April to May.

I. germanica—German Iris. Most popular of all the iris. Large blooms. Many varieties. May and June. 2-3 feet.

Bulbous iris

I. xiphioides (*anglica*)—English Iris.

I. Xiphium (*hispanica*)—Spanish Iris.

For culture see chapter on hardy bulbs.

Propagation and cultivation

Propagation is by division of the rhizomes. Garden varieties are hybrids and will not come true from seed.

FIG. 29.—Above, the oriental poppy. Below, yellow flag, *Iris Pseudacorus*.

Iris, especially the German varieties, will grow on any soil. They may be planted any time from August to October. Spring planting is not advisable. The clumps should be divided every three years. The rhizome divisions should not be set too deep as a heavy soil covering may cause root-rot. If the latter is prevalent, the rhizomes may be dusted with gypsum. In severe cases one should dig up the clumps, cut off diseased parts, sterilize the remainder with a weak solution of potassium permanganate, and replant. The only insect attacking the iris is the borer. To control, worms should be removed, or in bad cases plants dug up and burned.

HARDY POPPIES

Family, Papaveraceæ; Genus, *Papaver;* Species, various.

Ruskin once said, "The poppy is the most transparent and delicate of all the blooms of the field. The rest, nearly all of them, depend upon the texture of their surface for color. But the poppy is painted glass; it never glows so brightly as when the sun shines through it."

P. orientale—Oriental Poppy (Fig. 29)

This is the most robust and largest flowering of all the poppies, with flowers six inches or more in diameter. Plants stand three to four feet high, blooming in early summer. The original species is scarlet with black spot at base of petal. There are newer varieties in tints or shades of red, orange, salmon, pink. A white variety is also catalogued.

Varieties of oriental poppies are as follows:

Blush Queen—pale pink
Princess Ena—apricot-pink
Princess Victoria Louise—salmon-rose
Mrs. Perry—salmon-pink
Goliath—crimson scarlet
Duke of Teck—very dark crimson
Mahogany—mahogany-black
Perry's White—pure white

In order to get a start with the fine named varieties, it is advisable to buy plants from a reliable nursery. These may be set out in early spring, but preferably in early fall. Established plants may be divided and reset at this time also. A few named varieties come true from seed which may be planted in early spring or later in a coldframe. Young seedlings are transplanted to their permanent location in early fall. As the oriental poppy dies to the ground soon after flowering, it is advisable to plant quick growing annuals between the clumps to replace them temporarily in late summer. A light mulch during the winter is advisable.

P. nudicaule—Iceland Poppy

This is a dwarf species of hardy poppy growing a foot high. The flowers have petals of a beautiful texture in colors of white, yellow, and orange. Prompt removal of seed-pods or frequent cutting of the blossoms will cause the plants to bloom throughout the season. The cut-flowers have better keeping qualities than other poppies. However, they should be removed from the plant before the buds open. The Iceland poppy will establish itself in the border by self-sowing each year. The surest way is to grow them as a biennial. Seed planted in a coldframe during the summer will provide

plants to bloom the next season. It is also safer to winter them in a coldframe, transplanting early in the spring.

PEONIES (Figs. 30, 31)

Family, Ranunculaceæ; Genus, *Pæonia;* Species, various.

The peony is distinctly the flower for every garden and is easily one of the oustanding herbaceous perennials for the border or large beds. Anyone can grow peonies with less trouble than it takes to grow roses. They are permanent features of the garden and are perfectly hardy wherever apples can be raised. The blooms are large, showy, and variously formed, featuring all colors from white to purple—even pale yellow. Many varieties are deliciously fragrant. The peony is a popular cut-flower, but also well adapted for artistic landscape effects. Insects and diseases rarely attack peony plants. As in the case of the iris, the national society fostering peony growing has accomplished wonders in advancing the cause of this remarkable perennial.

Important garden species of Pæonia

P. tenuifolia—Fringed Peony. Petals dark red, double form resembling large rose. Foliage of plant finely cut. One flower on each stem. The earliest peony to bloom. May. 1-1½ feet.

P. officinalis—Common Peony. Native of Europe and in cultivation for hundreds of years. One flower on each stem, dark crimson. Disagreeable soapy aroma. Second early. May, June. 2-3 feet.

P. suffruticosa (*P. Moutan*)—Tree Peony. Native of China, where it has been in cultivation almost 2,000 years. Plants tall, branched, and woody. Flowers exceedingly large, one on a branch, white, pink, crimson.

FIG. 30.—Peonies are distinctly the flower for every man's garden.

Not often seen in American gardens. May and June. 3-6 feet.

P. albiflora (*P. edulis*)—Chinese Peony. This species comes from Siberia and is the parent of most of the modern garden varieties. Very hardy. Two to five flowers on a stem, single and double. June and July. The American Peony Society recognizes eight distinct types of bloom in the Albiflora varieties. They are Single, Anemone, Japanese, Bomb, Semi-double, Crown, Semi-rose and Rose. This classification is based on degree of doubleness in the flower.

There are so many good varieties of peonies in the trade at the present time that it is impossible to do justice to a complete list. Some of the finest and most expensive varieties in existence are given the following rating by the American Peony Society on the basis of 10 for total score:

Le Cygne	9.9	Tourangelle	9.4
Therese	9.8	Walter Faxon	9.3
Kelway's Glorious	9.8	Phillipps Revoire	9.3
Solange	9.7	Frances Willard	9.3
Mme. Jules Dessert	9.4	Martha Bulloch	9.3

For high quality and low cost the following are recommended by Reno Rosefield:

Adolphe Rousseau
Asa Gray
Baroness Schroeder
Couronne d'Or
Duchesse de Nemours
Edulis superba
Festiva maxima
Felix Crousse
James Kelway
Karl Rosefield
La Perle
Mme. de Verneville
Marguerite Gerard
Marie Lemoine
Media
Mons. Dupont
Mons. Jules Elie
Mons. Martin Cahusac
Octavie Demay
Reine Hortense
Sarah Bernhardt

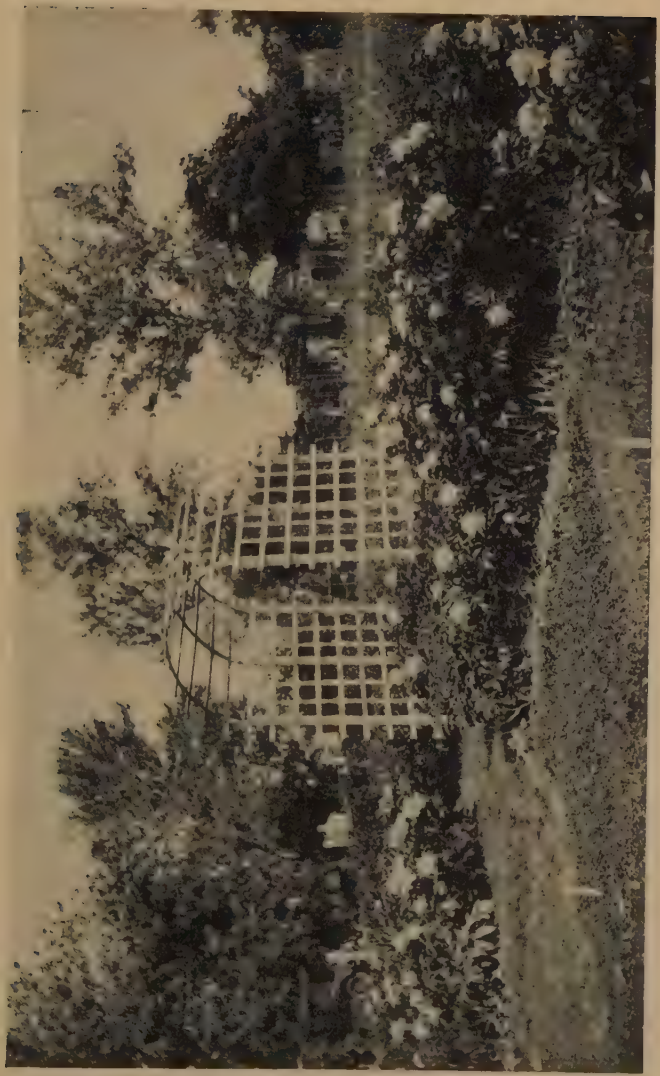

FIG. 31.—An interesting planting of peonies in combination with a lattice arch.

Propagation and cultivation

The most feasible method of propagating peonies is by division of the thickened roots. Early fall, September or October, is the best time for this operation. Transplanting peonies in the spring is a great shock to the plant and it is not advisable under any circumstances. In buying new stock it is possible to secure small divisions with two to five eyes or buds, two-year-old field-grown clumps or field-grown clumps older than two years. The two-year-old plants will probably give the best results in the end.

Peonies will grow in any soil providing it is rich in plant-food. Fertilizing must not be overdone, however, and the use of fresh manure just previous to planting is always dangerous. The crowns should be set about three feet apart each way and deep enough to cover the young buds or eyes with about two inches of soil. Disbudding means removing all flower-buds except the large terminal one. This practice results in larger blooms and should be done early. Late in the fall the tops should be cut close to the ground and burned to destroy fungous diseases. A light manure mulch helps but is not necessary except on newly planted stock to prevent heaving of the crowns by alternate freezing and thawing. It is good cultural practice to divide and transplant old clumps after six or eight years.

HARDY PHLOX

Family, Polemoniaceæ; Genus, *Phlox;* Species, various.

Phlox is an interesting garden plant for several reasons. Practically all the species are native to America and all are perennial except *P. Drummondii* which has been discussed in the chapter on annuals. Great varia-

tion is shown by the different types in growth habit, height, and type of inflorescence. A classification of garden species follows:

Low-growing, spring-flowering Phlox

P. subulata—Moss Phlox. A low tufted or matted plant with awl-shaped leaves. Flowers about one inch in diameter, white, light blue, pink, and purplish-rose. Rock-gardens and edging. Grows well on poor soil. April to May. 4-6 inches.

P. amœna—Lovely Phlox. Similar in growth habit to *P. subulata.* Flowers larger, purplish-rose. April to May. 6 inches.

P. stolonifera (*P. reptans*)—Creeping Phlox. Trailing plant producing two kinds of stems. Sterile branches are long and prostrate while the flowering stems are erect. Good ground-cover on heavy soil. Flowers in cluster, purplish-rose. 6-12 inches.

Semi-erect, spring-flowering

P. divaricata—Blue Phlox. Often incorrectly called Wild Sweet William. Fine for rock-garden in partial shade. Excellent to grow among tulips and other bulbs. Blue, pink, or white. April to May. 10-18 inches.

P. ovata—Laurel-leaved Phlox. Flowers few in a cluster, 1½ inches across, purplish-pink. Prefers moist location. May to June. 1-2 feet.

P. pilosa—Downy Phlox. Leaves narrow. Flowers purple, pink, or white. In rock-garden for erect effect. May to June. 1-2 feet.

Erect, summer flowering

P. glaberrima—Smooth Phlox. Narrow lanceolate leaves, taper-pointed. Flowers about 1 inch across, purplish-rose to magenta. June. 2-3 feet. Var. *suffruticosa* has broader leaves and stiffer growth. June. Many garden varieties.

P. paniculata (*P. decussata*)—Panicled Phlox. Pani-

cled flower-cluster shaped like a pyramid. Pink, purple, and white. July to August. 2-4 feet.

P. maculata—Sweet William Phlox. More slender than *P. paniculata*. Stem spotted. Smooth thick leaves. Hybrids of *P. paniculata* and *P. maculata* largely compose the garden varieties of the present day.

Garden varieties of hardy phlox

I. *Phlox glaberrima* var. *suffruticosa* type.
Miss Lingard—white with slight rose eye.
Perfection—white with red eye.
Modesty—purplish-rose.
Magnificence—purple-carmine.

II. *Phlox paniculata* type. Also hybrids with *P. maculata*.

White
F. G. Von Lassburg
Tapis Blanc
Fiancee
Mrs. Jenkins

White with small dark eye
Albion
Frau Bosch Bader
Aglae Adanson

White with large dark eye
Bridesmaid
Europa
Graf Zeppelin

Pink and salmon-pink
Elizabeth Campbell
Rynstroom
Evelyn

Scarlet
R. P. Struthers
Prof. Verschouv
Commander-in-chief
Fire-glow

Lilac and purple
Antonin Mercie
Champs Elysees
William Ramsey
Terre Neuve

Propagation and cultivation

Varieties of garden phlox are propagated chiefly by division of the clumps in early spring. Cuttings may be made from the main shoots in the spring or side shoots in summer. The seed method is not recommended.

Although the low-growing species do well on poor soil the varieties of the *P. paniculata* type require much

plant-food for good flower production. Plants should be divided every three or four years. Watering is necessary during dry seasons and frequent syringing of the foliage with a strong spray of water will hold the red-spider in check. In wet summers mildew is a serious pest. It can be checked by dusting foliage with powdered sulfur or spraying with bordeaux mixture or ammoniacal copper carbonate. The latter does not discolor the foliage. It is made by dissolving three ounces of copper carbonate in three quarts of ammonia, using a wooden vessel. When twenty-five gallons of water are added, the material is ready for use.

MISCELLANEOUS PERENNIALS

A well-planned flower-border calls for pleasing color combinations, plants correctly placed as to height and growth habit, and most important of all an arrangement to insure a succession of bloom throughout the season. It is natural for the gardener to make first choice among the popular perennials discussed in the preceding chapter. However, an elaborate plan will require the use of additional plant material. To assist in the preparation of such a plan four separate lists of desirable perennials have been prepared. The plants are arranged according to their flowering season. In using this list it is suggested that some perennials from each group be selected in order to provide color in the border or garden during each phase of the growing season.

Twenty-five spring-flowering perennials (April to May)

Adonis amurensis—Amur Adonis. Dwarf perennial with very attractive foliage. Does not permit of frequent transplanting. Yellow. 1 foot.

Alyssum saxatile—Golden-tuft, Basket-of-Gold. One

of the most popular early perennials for rock-gardens. Also suitable for general border. *A. rostratum* is later flowering. Yellow. 1 foot.

Arabis alpina—Alpine Rock-Cress. Remains in bloom six to eight weeks. Silvery-gray foliage. White. 6 inches.

Aubrietia deltoidea—Purple Rock-Cress. Flowers dark violet. Fine for edging and planting in rock-garden. Nurserymen now offer several named varieties. 6 inches. Violet-blue.

Bellis perennis—English Daisy. An old-fashioned flower but as interesting as its natural companion, the pansy. Like the latter it should be grown from seed each year. Seed started in August in a coldframe and given protection in the frame during the winter will provide blooming plants next spring. English daisies thrive in cool weather. Pink, white, and red. 4-6 inches.

Cerastium tomentosum—Snow-in-Summer. Also called Mouse-ear Chickweed. As the plant prefers a dry soil it is an excellent ground-cover in a sunny situation. Blooms later than arabis. Foliage silvery-gray. Flowers white. 6 inches.

Claytonia virginica—Spring Beauty. An ideal plant for damp rich soil and in partial shade. A native but listed in nursery catalogues specializing in rockery material. Light pink. 6 inches.

Convallaria majalis—Lily-of-the-Valley. Too well known as a cut-flower and spring-garden subject to require lengthy discussion. Shade-loving it does well under trees or on the north side of buildings. Fall planting of divisions is recommended over spring planting. White. 1 foot.

Dicentra eximia—Plumy Bleeding-Heart. One of the few perennials that can be depended on to bloom from spring until late autumn. Very attractive foliage. Grows equally well in sunshine or full shade. Dwarfer than the common bleeding-heart. Flowers pink. 1 foot.

Dicentra spectabilis—Common Bleeding-Heart (Fig. 32). A real old-fashioned garden flower, but ever in

good standing. Heart-shaped flowers in long racemes produced during May and June. Plant in open sunny border or in partial shade. Foliage very graceful and ornamental in early summer, but does not last all summer. Pink to rosy-red. 2-4 feet.

Doronicum caucasicum—Leopards-Bane. Yellow daisy-like flowers are a rare occurrence in spring.

Fig. 32.—The bleeding-heart.

Doronicum fills this requirement in a most satisfactory manner. Flowers suitable for cutting. Yellow. 1-2 feet.

Erythronium americanum—Dog-Tooth Violet. Leaves pale green, mottled with purple. Large yellow nodding flower. Plant in rock-garden or for naturalizing in wild areas. Yellow. 6 inches.

Euphorbia epithymoides (*E. polychroma*)—Cushion Spurge. Striking chrome-yellow floral parts. Very early. Yellow. 2 feet.

Helenium Hoopesii—Orange Sneezeweed. For contrast should be planted in front of or next to blue perennials as larkspur. Orange. 2-3 feet.

Hemerocallis flava—Lemon Day-Lily (Fig. 33). Useful as a border plant in connection with water-gardens. Flowers sometimes used for cutting. Lemon-yellow. 2-3 feet.

Hesperis matronalis—Sweet Rocket. Establishes itself by self-sowing. For ordinary culture best treated as a biennial with seed sown each year. White, flesh, or lavender. 1-3 feet.

Iberis sempervirens—Evergreen Candytuft. Annual forms of candytuft are perhaps better known. However, the perennial types are deserving of greater attention. *I. sempervirens* has white flowers, *I. gibraltarica* lavender. 8-12 inches.

Mertensia virginica—Bluebells. Another native flower that has been so much admired that its natural habitat has been greatly depleted. The ethical way to get a start with mertensia is to buy stock from a reliable nursery. Plant in early fall. Gentian-blue. 1½ feet.

Myosotis sylvatica—Forget-Me-Not. Loves a cool moist soil and partial shade. Such conditions prolong the season of bloom and add to its garden value. Blue. 8 inches.

Polemonium reptans—Creeping Polemonium. A fine ground-cover and much sought on account of the beautiful blue petals. Blue is a rare color early in the season.

Primula vulgaris (*P. acaulis*)—English Primrose. These little plants with their bright umbels of flowers are not at home in all climates. To succeed with them it will be necessary to provide a moist rich soil and partial shade. Light mulching with leaves in winter is beneficial. White, red, orange, and yellow. 6-12 inches.

Saponaria ocymoides—Rock Soapwort. Much at home in the rock-garden, but will succeed in any open sunny situation where a dwarf trailing plant is desired. Bright crimson. 8-12 inches.

Sedum acre—Gold-Moss or Stonecrop. One of the

FIG. 33.—Above, hostas or plantain-lilies. Below, hemerocallis is useful as a border plant or in connection with water-gardens.

dwarfest hardy plants. Yellow. 2-3 inches. Other dwarf early-flowering species are *S. album, S. dasyphyllum,* and *S. sarmentosum.* All are suitable for rock-gardens or edging borders.

Trollius europæus—Globe-Flower. Too much cannot be said in favor of the globe-flower which seems to grow equally well in dry soil or in places too damp for other perennials. Blooms resemble huge buttercups, and keep well as a cut-flower. Orange and yellow. 1½-2 feet.

Vinca minor—Common Periwinkle. Low trailing habit. Evergreen foliage. Flowers lilac-blue. There is a white-flowered form and also one with silvery variegated leaves. Excellent ground-cover. Blooms all summer.

Thirty early summer-flowering perennials (June to July)

Amsonia Tabernæmontana (*A. salicifolia*)—Willow Amsonia. Lasting foliage and delicate blue flowers make amsonia a valuable addition to the blue border. Individual plants have a shrub-like appearance. Blue. 2 feet.

Anchusa azurea (*A. italica*)—Alkanet or Italian Bugloss. Tall perennials covered with gentian-blue flowers. Keeping the plant free from seed encourages constant bloom. Self-sows readily and young plants should be cultivated to replace old clumps which sometimes die after the second year. Dropmore is the best-known variety. Opal and Pride of Dover are also very good. Blue. 3-5 feet.

Anthemis tinctoria—Golden Marguerite. Compact bushy plants covered with rich yellow flowers suitable for cutting. Var. *Kelwayi* is superior to the species. Yellow. 2-3 feet.

Astilbe japonica—Japanese Astilbe. The feathery panicles resemble certain types of spiræa and they are frequently but erroneously given this name. Named hybrids are catalogued by nurserymen. Astilbes require much water during the growing season. Can stand partial shade. White, pink, red. 18 inches.

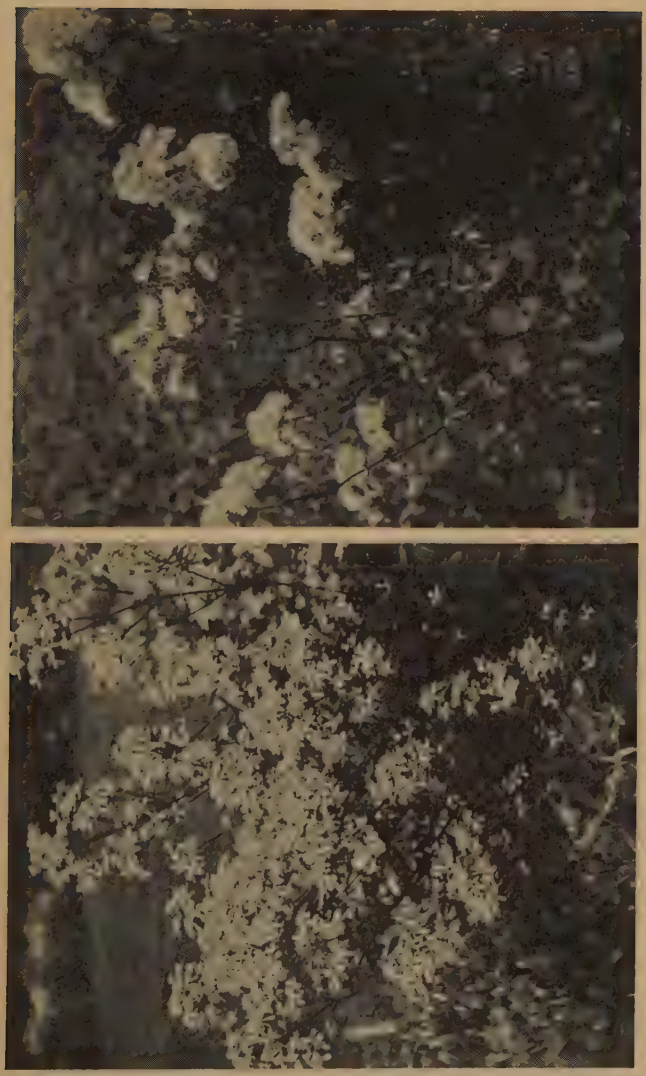

FIG. 34.—Left, *Clematis recta*. Right, thalictrum.

Baptisia australis—False Indigo. A member of the legume family with characteristic and beautiful foliage. Dark blue. 3-4 feet.

Campanula persicifolia—Peach-leaf Bellflower. Resembles common Canterbury bell, but foliage is quite distinct. Blue or white. 2 feet.

Centaurea montana—Mountain Cornflower. One is reminded of the annual blue cornflower, but the perennial species has larger heads and does not bloom profusely at one time. Blue or white. 2 feet.

Centranthus ruber (*Valeriana coccinea*)—Jupiters Beard. Centranthus is a most useful perennial in the rock-garden, border, for beds and cutting. Has a rather long season of blooming. Red or white. 2-3 feet.

Clematis recta (Fig. 34). Resembles *C. virginiana* in everything except growth habit and blooming season which is much earlier. Large clusters of small white flowers. Plants need a little support when growth is too rank. White. 3 feet.

Coreopsis lanceolata—Perennial Coreopsis (Fig. 35). Too well known to require much description. An all-round plant in the border or cut-flower garden. Perry's variety is a recent introduction and has double flowers. Yellow. 2-3 feet.

Dictanus albus (*D. Fraxinella*)—Gasplant. Should be used in more plantings. Beautiful flowers and foliage. Adds dignity to the border or background. Common name "gasplant" originated because of the inflammable gas given off by the flowers in dry weather. White or rosy-purple. 2-4 feet.

Echinops Ritro—Globe Thistle (Fig. 36). The globular heads of steel-blue flowers are sure to attract much attention. Begins to flower in July. Blue. 3-4 feet.

Erigeron speciosus—Oregon Fleabane. Purple daisy-like flowers with yellow centers, resembling the hardy aster. Continuous bloom. Purple. 2 feet.

Geranium sanguineum—Cranesbill. Compact, blood-red. Other species are white or purple. 18 inches.

Geum chiloense (*G. coccineum*)—Avens. Dazzling scarlet flowers. 1 foot.

FIG. 35.—Above, coreopsis, suitable for borders or cut-flowers. Below, when other flowers have succumbed to frost, gaillardias still maintain their rugged beauty.

Gypsophila paniculata—Perennial Babys-Breath (Fig. 37). As a border plant in masses or as a cut-flower, the mist-like sprays of gypsophila have a softening effect on the harsh colors of other sorts. An indispensable perennial. Single or double. White. 2-3 feet.

Heuchera sanguinea—Coral Bells. The development of horticultural varieties from the crimson species has widened the scope of heuchera as a garden subject. Crimson, pink, scarlet, and white. 1½ feet.

Lupinus polyphyllus—Perennial Lupine. Large palmate leaves. Pea-shaped flowers borne in long spikes. Prefers acid soil. Bluish-purple, white, and pink. 2-4 feet.

Lychnis chalcedonica—Maltese Cross. Fiery red and should not be overdone. 2-3 feet.

Lythrum Salicaria var. *roseum*—Rose Loosestrife. Easily naturalized in bog-garden. Does well in ordinary soil. Long graceful spikes. Rose-pink. 3-4 feet.

Œnothera fruticosa—Evening Primrose. Large showy flowers. Long blooming season. There are other species of Œnothera of garden value, as *O. missouriensis*, a trailing form, and *O. biennis*, the old-fashioned biennial. 1-3 feet.

Penstemon lævigatus—Smooth Penstemon. Bell-shaped tubular flowers. Plant in open border. White with purple markings. 3-4 feet.

Penstemon Torreyi (*P. barbatus* var. *Torreyi*)—Torreys Penstemon. A slender type. Combines well with *Clematis recta*. Spikes good for cutting. Scarlet-coral. 3-4 feet.

Polemonium cæruleum—Greek Valerian. Very attractive foliage. Plants in flower for a long time. Fairly tall and upright. Other species of Polemonium are dwarf or trailing. Blue or white. 1½ feet.

Thalictrum aquilegifolium—Columbine Meadow Rue (Fig. 34). Handsome foliage. Feathery flower-heads in purple, yellow, or white. A high-class bedding or border plant. *T. adiantifolium* has finer leaves resembling maidenhair ferns. 3 feet.

FIG. 36.—Above, the steel-blue globular heads of echinops. Below, platycodon or balloon-flower.

Thermopsis caroliniana—Carolina Thermopsis. An interesting member of the legume family. Clover-like foliage. Yellow. 4-5 feet.

Valeriana officinalis—Garden Heliotrope. Often confused with *Centranthus ruber* in catalogues. The garden heliotrope has deeply cut foliage and very fragrant flowers. Delicate pink, almost white. 3-5 feet.

Verbascum olympicum—Olympic Mullein. The showiest of the mulleins. Silvery-white foliage. Long spikes. Suitable for large borders. Thrives in a dry situation. Yellow. 4-6 feet.

Veronica spicata—Spike Speedwell. A reliable blue perennial for beds or borders. Combines well with Shasta daisy, coreopsis, or anthemis. Blue. 1½-2 feet.

Yucca filamentosa—Adams Needle, Common Yucca. Prefers a dry situation, but will grow anywhere. A striking plant when in flower. Very effective at garden entrances or as accent points in a large border. White. 3-6 feet.

Thirty late summer-flowering perennials (July to August)

Achillea Millefolium var. *roseum*—Pink Yarrow. Dense heads of rosy-pink flowers. Foliage finely cut. Plants easily naturalized. Flowers from July until late fall. Pink. 2 feet.

Achillea Ptarmica—Sneezewort. The Pearl and Boule de Neige are double forms and are decidedly more useful than the species. For borders or cutting. White. 1-2 feet.

Asclepias tuberosa—Butterfly-Weed. Large heads of orange flowers are most striking. A native perennial and grows well in dry places. Orange. 2 feet.

Bocconia or *Macleaya cordata*—Plume Poppy. The largest member of the poppy family. Beautiful gray foliage. Recommended for the spacious border. Flowers plume-like, greenish-pink. 6-8 feet.

Calimeris incisa—Calimeris. Resembles dwarf forms of native aster. Star-like flowers. July through September. White, sometimes light blue. 1-2 feet.

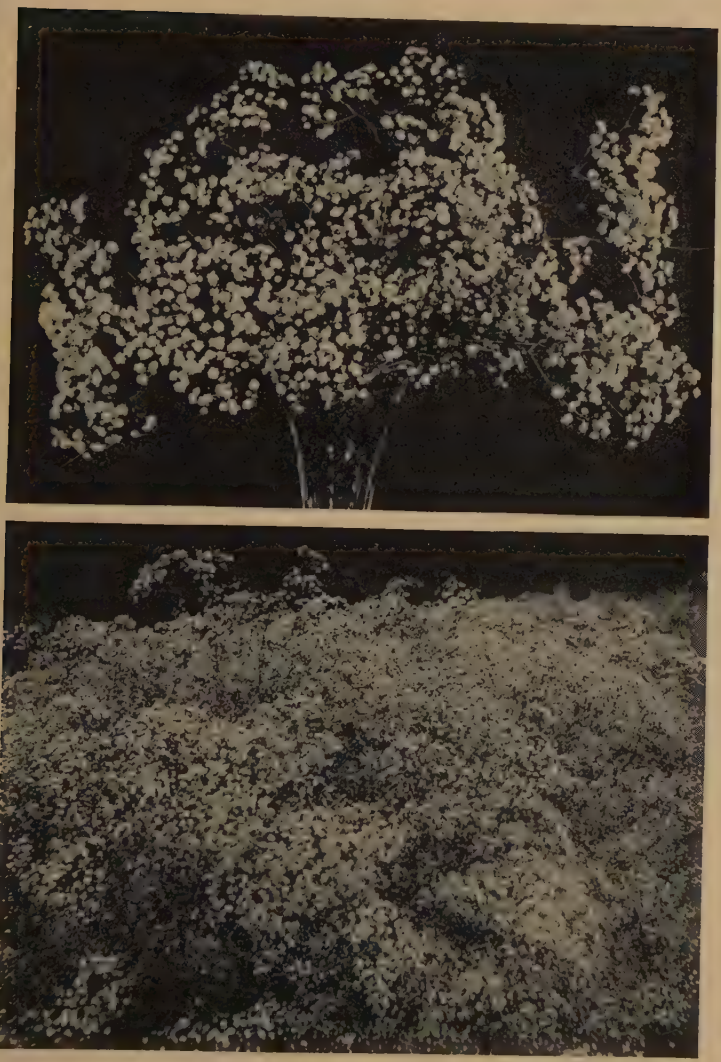

FIG. 37.—Mist-like sprays of *Gypsophila paniculata,* effective in garden or basket.

Campanula carpatica—Carpathian Harebell. A miniature bellflower but very floriferous. Plants often form wreath-like circles. Good edging or low border plant. Often planted in rock-gardens. Blue or white. 6-12 inches.

Cimicifuga racemosa—Black Snakeroot or Cohosh. Decidedly more interesting than the name would indicate. Hardy native plant. At its best in rich moist soil in partial shade. Long racemes of white flowers. Showy. White. 4-8 feet.

Echinacea purpurea (*Rudbeckia purpurea*)—Purple Coneflower. Another native plant often seen along roadsides in late summer. Garden culture has increased size of heads and improved the color. Reddish-purple. 3-4 feet.

Eryngium amethystinum—Amethyst Sea-Holly. Reminds one of small thistles. Glaucous-blue-gray foliage, making the plant attractive with or without bloom. The flowers may be dried for use in winter bouquets. Blue. 2 feet.

Euphorbia corollata—Flowering Spurge. Dainty white flowers often mistaken for babys-breath. For borders and bouquets. White. 2-4 feet.

Gaillardia aristata (*G. grandiflora*)—Perennial Gaillardia (Fig. 35). Too well known to require detailed description. Continuous flowering and one of last perennials to succumb to freezing weather. All uses in garden or as a cut-flower. Yellow and orange-red. 1½ feet.

Galega officinalis—Goats Rue. Clover-like foliage. Rosy-purple blooms. A white horticultural variety is *alba*. 3-4 feet.

Geranium ibericum—Iberian Cranesbill. A late flowering species of hardy geranium. One of the best. Rich deep violet. 1 foot.

Hemerocallis fulva—Tawny Day-Lily. The common orange-colored day-lily. Other species flowering at the same season are *H. Thunbergii*, *H. aurantiaca* and *H. fulva* var. *Kwanso*. Orange. 2-3 feet.

Hosta (*Funkia*)—Plantain-Lily (Fig. 33). There are

several species of plantain-lily, all highly desirable. Beautiful foliage and equally attractive flowers in blue or white during July and August. Can be grown anywhere and are recommended for partly shaded situations. *H. cœrulea, H. japonica, H. plantaginea, H. Sieboldiana* and *H. Fortunei* are fine species. 1½-2 feet.

Lathyrus latifolius—Perennial Pea. Annual sweet peas are so popular that they have undoubtedly overshadowed the perennial *L. latifolius.* Climbing hardy plants with blossoms in larger clusters than the annual type. Fine for trellises, walls or for covering banks. Pink or white.

Liatris pycnostachya—Blazing Star or Gayfeather. Flowers in tall spikes unusual in that the individual blossoms begin to open at the top of the spike. Plant in large masses for striking effects. Purple. 4-5 feet.

Limonium latifolium—Sea-Lavender. Serves the same purpose in the border or as a cut-flower as perennial gypsophila. Flower-heads mist-like, pale lavender. May be dried as an everlasting. 2 feet.

Linum perenne—Perennial Flax. A lovely plant with bright blue flowers produced daily in great profusion. Foliage very fine and feathery. For striking contrast plant with *Anthemis tinctoria* or *Calimeris incisa.* Readily self-sows. Blue. 1½ feet.

Lysimachia clethroides—Clethra Loosestrife. Hardy species from Japan. Long spikes of pure white flowers. After blooms have disappeared the foliage takes on attractive fall coloring. 2 feet.

Monarda didyma—Oswego Bee Balm. Bright scarlet flowers. Aromatic foliage. Horticultural varieties *rosea, salmonea* and *violacea superba* have pink, salmon, and purple flowers respectively. 3 feet.

Œnothera speciosa—Sundrops. Late white-flowering. 1½ feet.

Physostegia virginiana—False Dragonhead. Hardy, spreads rapidly in garden, but well worth adding to any collection. Should have a dark background to bring out the delicate color. Pink. 2-3 feet.

Platycodon grandiflorum—Balloon-Flower (Fig. 36). Many plant-lovers consider the balloon-flower the most beautiful hardy plant in cultivation. The buds give the plant its common name as they resemble tiny balloons. The flowers when open are star-shaped. Blue or white. 1-2 feet.

Rudbeckia laciniata—Cutleaf Coneflower. The species is rarely seen in gardens, but the horticultural variety Golden Glow is most common. A recent improvement on the latter is called Golden Globe. Red aphis frequent the tips of the growing shoots of rudbeckias, but are easily killed with nicotine spray. Yellow. 4-7 feet.

Salvia nemorosa—Violet Sage. A good salvia for the summer border. Constantly in flower. Usually catalogued as *S. virgata.* The latter is a bright blue species and rather rare. *S. nemorosa* has bronzy-purple flowers. 2-3 feet.

Thalictrum dipterocarpum—Yunnan Meadow Rue. Unfortunately this plant is not perfectly hardy in very severe climates. May be stored in moss and wintered over in a cold frost-proof cellar. Seedlings given cold-frame treatment over winter will bloom the next season. Flowers rose-purple with yellow stamens. 5 feet.

Tunica Saxifraga—Tunic-Flower. An ideal edging plant or for rock-gardens. Will seed itself if given an opportunity. Pink. 6 inches.

Veronica longifolia var. *subsessilis*—Clump Speedwell. All veronicas classified as garden species are desirable, but this surpasses them all. Has an extremely long season of bloom. Blue. 2 feet.

Viola cornuta—Tufted Pansy. Smaller flowering than the common pansy, but better able to withstand hot weather. Continues to flower long after the first frosts have destroyed other fall flowers. Many named varieties. All colors. 6 inches.

Twenty-five autumn-flowering perennials (September to October)

Aconitum Fischeri—Azure Monkshood. One of the

choicest aconitums producing spikes of pale blue flowers. Excellent for the late blue border. 1-2 feet.

Anemone japonica—Japanese Anemone. Exceedingly graceful and beautiful flowers produced on equally graceful plants. They are called wind-flowers as they respond to the slightest breath of air blown against them. Among the last perennials to bloom. Cultural requirements include partial shade and much moisture in the growing season. Also a light mulch during the winter. White, light and dark pink. 2-3 feet.

Artemisia Abrotanum—Southernwood, Old Man. Leaves have a pleasing aroma, dark green color. A handsome species. Flowers yellowish-white. 2-3 feet.

Artemisia Stelleriana—Beach Wormwood, Old Woman. On account of the silvery-white foliage this artemisia is often called a dusty miller. Much used in rock-gardens. Silvery-white. 1-2 feet.

Artemisia vulgaris—Mugwort. A variety is sold under the name *A. lactiflora.* The flowers are white and fragrant and where the plant is hardy should be classed as a highly desirable autumn garden flower. 3-4 feet.

Boltonia asteroides—Boltonia. Tall spreading plants resembling hardy asters. *B. asteroides* is white, *B. latisquama* lavender-pink. 4-5 feet.

Cassia marilandica—Wild Senna. A decided novelty with interesting yellow blossoms. For spacious borders and effective when planted in large masses. 5-6 feet.

Ceratostigma plumbaginoides (*Plumbago Larpentæ*)—Blue Leadwort. Dwarf and spreading in habit. Blooms during August and September. Deep blue. ½-1 foot.

Chelone glabra—Turtlehead. Odd shaped blossoms, creamy-white. *C. Lyoni* has purplish-red bloom. 2-3 feet.

Eupatorium cœlestinum—Mist-Flower. The light blue flower-heads of this late species remind one of the ageratum. Good blue perennials for autumn bloom are rather scarce so the mist-flower is a most welcome addition to the border. Blue. 2 feet.

Helenium autumnale—Helens Flower. Fine yellow flowers with brown centers produced in large clusters. Variety Riverton Beauty has a purplish-black cone or center. Varieties Riverton Gem and *rubrum* feature red and terra-cotta as the major colors. 3-5 feet.

Helianthus decapetalus var. *multiflorus*—Sunflower. Small yellow flowers produced in great profusion. A horticultural variety of the common wild sunflower. Early. 4-5 feet.

Helianthus Maximiliani—Maximilian Sunflower. A valuable garden species where early frosts will not interfere with normal bloom. This is one of the last sunflowers to bloom and, therefore, requires a long season. Clear yellow. 6-8 feet.

Helianthus scaberrimus (*H. rigidus*)—Prairie Sunflower. A most graceful species. Tall with long drooping willowy leaves. Variety Wolley Dod is an improved sort. Lemon-yellow with deeper center. 8-10 feet.

Heliopsis helianthoides var. *Pitcheriana*—Orange Sunflower. Rather difficult to distinguish this genus from some of the sunflowers. Recommended for dry places. Orange-yellow. 3-4 feet.

Hibiscus Moscheutos—Rose Mallow. Late-blooming perennials resembling giant hollyhocks. Hybrids in white, pink, and crimson. Also white with crimson center. Very hardy but slow to start growth in the spring. 5-6 feet.

Lespedeza bicolor—Bush Clover. Graceful shrub-like perennials covered with purple-crimson bloom. 4-6 feet.

Liatris spicata—Spike Gayfeather. Long spikes of purple. 2-3 feet. *L. scariosa* is another fall-blooming species growing somewhat taller. Color deep purple.

Lobelia cardinalis—Cardinal-Flower. Red is a rather uncommon color among native northern plants, but *L. cardinalis* makes up for the shortage. Prefers moist soil and partial shade. Intense scarlet. 3 feet.

Lobelia syphilitica—Great Blue Lobelia. Quite a contrast to the preceding species. Somewhat later flowering. Blue. 3 feet.

FIG. 38.—Rudbeckias, or coneflowers, are amongst the showiest of yellow perennials.

Polygonum Sieboldi (*P. cuspidatum*)—Fleece-Flower. Fine for massing in the border. Creamy-white. 3-5 feet.

Rudbeckia speciosa (*R. Newmani*)—Showy Cone-flower (Fig. 38). A good cut-flower as well as border subject. Orange-yellow. 2 feet.

Salvia azurea—Azure Sage. Without doubt the finest of the hardy blue salvias. At its best early in Septem-

Fig. 39.—*Sedum spectabile* or showy sedum.

ber. As a cut-flower combines beautifully with orange gladioli. Sky-blue. 3-6 feet.

Sedum spectabile—Showy Sedum (Fig. 39). The common name of this plant is well chosen as it is the showiest of all the sedums. The foliage is attractive all summer. Light pink. 1½ feet.

Solidago—Goldenrod (Fig. 40). A plant in ill repute with some hay-fever patients who eye it with suspicion because of time-worn ideas concerning this beautiful native plant. A most graceful perennial. *S. canadensis*, *S. nemoralis* and *S. Virgaurea* have yellow bloom. *S. bicolor* is known as silverrod on account of its white flowers. 1-5 feet.

FIG. 40.—Above, planting of foxglove. Below, goldenrod is one of the most beautiful native plants.

BIENNIALS AND PERENNIALS GROWN AS BIENNIALS

In garden practice the term biennial is relative as plants not actually biennials in the strict sense are classified with them nevertheless. This is largely due to convenience in the matter of cultivation. A true biennial is a plant that completes its life cycle within the span of two years. Usually these plants produce only vegetative growth the first year and flowers the second year. Then the plant dies. Canterbury bells and foxgloves (Fig. 40) are outstanding examples of horticultural biennials. An explanation of how to grow them will suffice for other plants in this class and cultural principles may be modified to suit the climate at hand.

In regions where winter-killing or rotting of the crowns is not to be feared, Canterbury bells and similar plants may be grown in the open garden from seed to maturity. All that is required is planting of the seed in early summer (June or July), later transplanting the seedlings to their permanent quarters. With the coming of cold weather a light mulch of dry leaves, marsh hay, or strawy litter is placed between the crowns and among the foliage in such a way that centers are not covered to the point of smothering. Heavy mulching invariably results in rotting of the crowns and this is the universal tale of woe told by Canterbury bell and foxglove enthusiasts who try the open garden culture in severe climates. When this method is impracticable, it will be a great convenience to use a coldframe for wintering the crowns. Instead of transplanting the seedlings to the garden they should either be potted in three- or four-inch pots or transplanted to a coldframe, allowing eight to ten inches

FIG. 41.—One never tires of the stately hollyhock.

between plants. The potted stock should also be placed in a coldframe, plunging the pots to the rim in soil. Plants grown in coldframes may then be protected by a mulch of dry leaves and a covering of hotbed sash or boards or both. The main principles involved in winter protection are maintaining a uniform cold temperature and keeping the crowns dry. The plants may be flowered in the coldframes, but the usual procedure involves transplanting to beds or border in the garden early in the spring. This special method of protecting biennials applies chiefly to Canterbury bells and foxglove. Other plant material in the list which follows is sufficiently hardy to stand garden culture.

Althæa rosea—Hollyhock (Fig. 41). Best grown as a biennial. Will seed themselves if left undisturbed. Single, double, and fringed types. White, pink, red, and yellow. 4-8 feet.

Anchusa azurea (*A. italica*)—Alkanet. See page 102.

Campanula Medium—Canterbury Bells. White, pink, blue. 2-3 feet. Var. *calycanthema* is Cup-and-Saucer type.

Campanula pyramidalis—Chimney Bellflower. Short-lived perennial, best treated as biennial. Blue. 4-6 feet.

Dianthus barbatus—Sweet William. See page 84.

Digitalis purpurea—Foxglove. White, pink, lavender, flowers spotted. Var. *gloxiniæflora* has wide-mouthed flowers.

Hesperis matronalis—Sweet Rocket. See page 100.

Lunaria biennis—Honesty, Money-Plant. White or purple. Grown for satiny seed-pods which are useful in winter bouquets. 2-3 feet.

CHAPTER VII

GARDEN ROSES

The rose has been called the queen of the flowers and its universal popularity is clearly shown by the fact that persons attempt to grow roses in all parts of the world. Although the rigorous and rather changeable climate of certain parts of the United States offers some handicaps to rose enthusiasts, it is possible to select certain types of roses which can be grown easily in any location in which other garden flowers are successful. The wise gardener is careful to study the particular situation in question before selecting varieties and types for planting. For the average home-garden the following classes of roses will be most suitable.

ROSES FOR COLD CLIMATES

1. *Hybrid Perpetual* (Figs. 42, 43)

This class of bush-roses is characterized by rather stiff upright growth. The foliage is large, dull-colored, and somewhat wrinkled. The flowers are large and borne in great profusion during June. The name Perpetual is somewhat of a misnomer due to the fact that most of the varieties in this class bloom only once in the summer and do not yield a perpetual supply of flowers as the name would indicate. Their chief value lies in their extreme hardiness and they require little or no protection. On account of their

FIG. 42.—Hybrid Perpetual roses are characterized by a stiff upright growth.

FIG. 43.—Above, Hybrid Perpetual rose "Frau Karl Druschki." Below, Hybrid Tea rose "Jonkheer J. L. Mock."

size they are best adapted to large gardens or for park planting. The Hybrid Perpetual roses are recommended to beginners as they are of easy cultivation.

2. *Hybrid Rugosa and Rugosa roses*

From Japan and northeastern Asia comes the hardy rose species known as *R. rugosa* on account of its thick wrinkled leaves. The plants are the essence of vigor and have heavy stems of upright habit. They are popular because of their extreme hardiness, large fragrant blooms produced in great profusion in white, pink and red. Rose hybridizers have crossed the species with other roses and as a result produced some excellent hybrids. In using Rugosa or Hybrid Rugosas in the garden it is well to remember their rampant growth. They are, therefore, not suitable companions for Hybrid Tea and other more delicate types, but are useful for yard planting and grouping with shrubbery.

3. *Moss roses*

This type of rose is of very ancient origin and gets its name from the mossy growth on the calyx or sepals. The buds are always interesting both in appearance and fragrance. The plants are hardy, but require good care as they are subject to mildew. A few moss roses are a welcome addition to any rose collection, but it is not advisable to plant too many.

4. *Hybrid Tea roses* (Fig. 43)

The Hybrid Tea roses are the result of crossing Hybrid Perpetual varieties with the true tea rose.

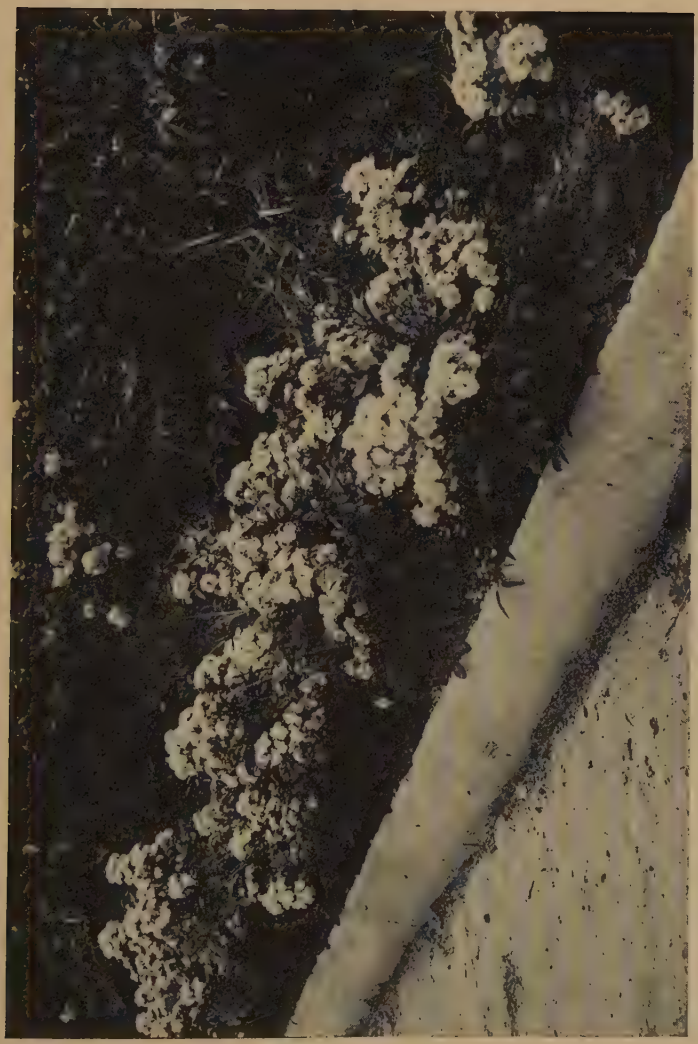

FIG. 44.—Dwarf Polyantha or Baby Rambler roses are highly satisfactory for general garden planting.

They occupy the most prominent place in modern rose-gardening and their popularity is well deserved. Hybrid Tea roses are noted for their continuous bloom, fragrance, variety of colors, pleasing form of bud and flower, and above all are fairly hardy if protected where the temperature drops below ten degrees above zero on the Fahrenheit scale. In northern gardens they are the logical substitutes for tea roses which are not recommended because of their tender habits.

It is proper here to mention the little known Pernetiana roses which in reality are Hybrid Teas crossed with such hardy species as Persian Yellow and Harison's Yellow which are discussed later. The Pernetiana class is about as hardy as the Hybrid Tea, but has the disadvantage of being susceptible to the disease known as black-spot.

5. *Dwarf Polyantha or Baby Rambler roses* (Fig. 44)

Here is a class of shapely roses of dwarf habit deserving of more attention by all rose-growers. There are disadvantages in lack of much fragrance. However, they make up by continuous flowering. Many small blooms in large clusters is the rule. As to hardiness they are the equal of the Hybrid Tea class. Polyanthas are ideal edging roses or for use in small beds for all season effects.

6. *Miscellaneous hardy rose hybrids and species*

In this group it is well to consider a select list of very hardy species or hybrids which have demonstrated their garden value. The Austrian Briars, the

FIG. 45.—A porch trellis featuring the old favorite "Dorothy Perkins."

Sweetbriers, *Rosa Hugonis, R. xanthina* are unusual roses and reliable as to hardiness. They serve the same purpose as many shrubs for planting in natural borders and screens and their chief use is for landscape effect.

7. *Hardy climbers or rambler roses* (Figs. 45, 46)

The old-fashioned climbing roses were extremely hardy as they were descendants of *Rosa setigera* or prairie rose. They are safe to grow without protection in very severe climates. The newer varieties of climbing roses are hybrids of the *R. multiflora*, the many-flowered rose, and *R. Wichuraiana*, the so-called memorial rose. They are for the most part fairly hardy, but the cautious gardener will afford them some protection as explained later in the text. From the standpoint of bloom there are two types of hardy climbers, large- and small-flowered, the latter usually borne in large clusters. Climbing roses are useful as trellis subjects or for covering pillars, fences, walls, and banks.

ROSES FOR MILD AND WARM CLIMATES

The foregoing classes of roses are adapted to the milder climates, but rose lovers need not confine themselves to this rather limited list in regions where severe temperatures are no obstacle. States in the latitude with Washington, D. C., and farther south may use varieties from any of the following types of roses not previously recommended: Tea, Climbing Hybrid Tea, Noisette, Climbing Polyantha.

FIG. 46.—Climbing American Beauty trained as a pillar rose.

CULTIVATION OF ROSES (Figs. 47, 48)

Roses are at their best when grown by themselves. Therefore, the most suitable place is a specially prepared bed or border where they will not suffer by competition with perennials or other plants. A sunny open area sheltered from severe west or north winds is a very desirable location for rose beds. If one does not have an entire garden devoted to the flower, special beds may be set aside in a mixed flower-garden or they may be placed along the borders of lawns. Care should be observed not to plant too near large trees which have a tendency to steal most of the plant-food and moisture intended for the roses.

FIG. 47.—Rough cedar posts are satisfactory supports for climbing roses trained as pillars.

Roses are somewhat particular as to the type of soil. Sandy soil or locations where the subsoil is gravelly should be avoided except for Rugosa or Japanese roses. Most other garden varieties seem to thrive in a rather

heavy clay loam. Many failures in rose-growing are due to lack of fertility of soils. An ideal rose bed should be prepared to a depth of two to two and a half feet. In the bottom of this bed about six inches of stones may be placed for drainage, on top a layer of cow-manure, and the balance of the bed filled with good rich loam consisting of at least one-quarter rotted manure.

Fig. 48.—A wire fence effectively covered with hardy ramblers.

If cow-manure is not available some benefit may be derived by the use of one-half pound of bone-meal to a square yard of soil.

Some thought should be given to the size of the rose bed. Four feet is a good average width. A bed five feet wide will be too large for most practical purposes.

Most artistic effects are secured when grass paths surround the individual beds. If an entire garden is devoted to roses the same may be surrounded with a hedge or tall screen planting which serves the double

purpose of protecting the roses and acting as color background for the bushes when in bloom.

The average amateur is usually puzzled when the time comes to place an order for rose bushes. Better service can be expected from nurseries and rose specialists if the buyer is prepared to make a definite statement in the order as to the age and kind of plants wanted. Some catalogues list roses grown on their own roots while others sell only budded plants. Both kinds are available as one-year-old or two-year-old plants and both may be secured in a dormant condition or growing in pots. This is very confusing to the beginner, but it is reasuring to know that success may be obtained with any of these plants. However, the past experience of many rosarians clearly shows that for general conditions in most sections two-year-old field-grown dormant plants will give the greatest satisfaction. So-called bench roses are grown in greenhouses by commercial florists and they are usually limited to a few Hybrid Tea varieties. Florists renew their greenhouse stock every year or two and the discarded plants may be purchased at a reasonable price. If cut back severely and planted promptly

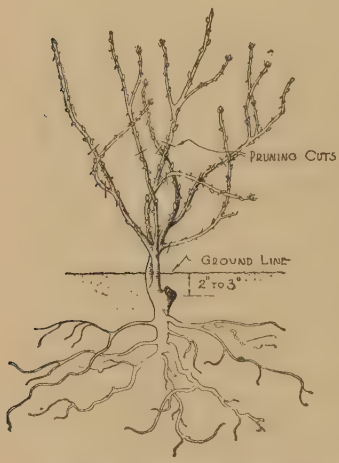

FIG. 49.—Hybrid Tea roses are pruned severely each spring. Note the enlargement under ground where the plant was originally budded.

they will do as a source of cut-flowers, but should not be depended on for the best results. As a rule greenhouse-grown plants are not as hardy as field-grown roses.

The general practice recommended for planting shrubs and hardy perennials is a fairly safe guide for roses. In regions where fall planting is always safe for shrubs and perennials it may be advisable to apply the same to roses. Early spring—that is, late in March or early in April—is the safest time, however, and has many advantages. A large deep hole should be prepared for each rose bush, remembering to set them two to three inches deeper than they were in the nursery row or flower-pot. The planting distance for bush roses varies as follows: Hybrid Perpetuals should be planted twenty-four inches apart each way, Hybrid Teas and Dwarf Polyanthas sixteen to eighteen inches each way.

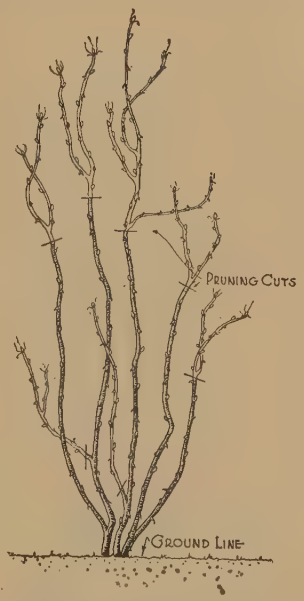

Fig. 50. — In pruning Hybrid Perpetual roses, about two-thirds of last year's growth should be removed. Retain only thick healthy wood.

The secret of the size and number of individual blooms lies largely in intelligent pruning of the rose bushes (Figs. 49-52). The first pruning after planting should be while the plants are still dormant and for most kinds of roses should be very severe. That is to say, the first prunning, after the

plants are located in their permanent positions, requires the removal of all branches to within six or eight inches of the ground. Hybrid Tea roses should be pruned as severely as suggested above each year. In case of Hybrid Perpetuals about two-thirds of last year's growth should be removed.

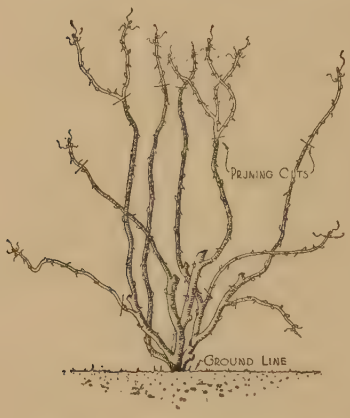

FIG. 51.—Spring pruning of Rugosa and other bush roses encourages the growth of more flowering wood. The shaded areas indicate the wood that may be retained profitably.

The best time for pruning the bedding roses is in early spring before any growth is made. In case of climbers the procedure is somewhat different after the first pruning. They require attention each year after blooming, which is usually in August, and at that time all dead wood, shoots, weak branches, and old canes should be removed. The principle to remember in pruning climbers is that next year's blooms are formed on the canes produced this year.

CONTROLLING INSECTS AND DISEASES

A number of pests appear from time to time and are likely to take the joy out of rose-growing unless one is prepared to combat the same. Rose mildew is a common fungous disease which makes its appearance in the form of a white powdery substance on the surface of the leaves. Leaf-spot is another fungous trouble which

attacks the foliage and which can readily be seen as small black spots. Both of these troubles may be prevented or controlled by dusting with powdered sulfur while the dew is on the foliage or by spraying the plants with a solution of potassium sulfide made up at the rate of one ounce of potassium solution to three gallons of water.

For green or black plant-lice a solution of nicotine sulfate or tobacco extract should be used. The 40 per cent strength is recommended and this should be added to water at the rate of one teaspoonful of nicotine sulfate to three quarts of water.

FIG. 52. — Hardy climbing roses are best pruned after the flowering season. Remove all weak growths and old dark-colored canes that have previously produced flowers.

One of the worst pests attacking garden roses, especially climbers, is the small green rose-worm which feeds on the foliage. The quickest way to control this insect is to spray the rose with a solution of arsenate of lead. This is easily made by adding three level tablespoonfuls of powered arsenate of lead to one gallon of water.

If one wishes to be on the safe side a good preventive for insects and diseases can be made by using the following mixture: one part dusting arsenate of lead, one part powdered tobacco, nine parts dusting sulfur. This mixture should be dusted on the plants

while the dew is on the foliage about once every two weeks.

WINTER PROTECTION (Fig. 53)

Since a special effort was made to suggest the hardiest roses for cold climate planting, winter protection is only necessary with a few kinds of roses. Hybrid Tea and Baby Rambler roses should be protected carefully by drawing earth up around the stems to a height of about

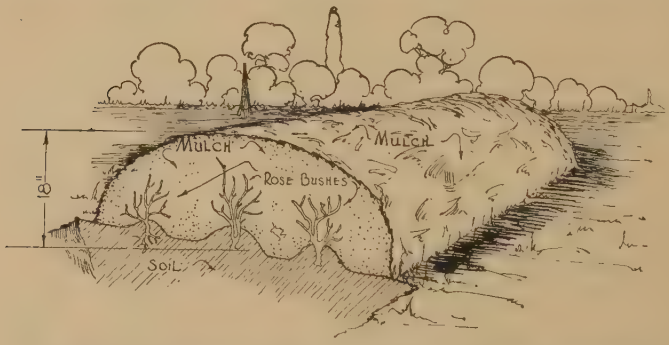

FIG. 53.—Cross-section of a bed of Hybrid Tea roses showing method of protection for cold climates. After hilling soil around the base of each plant, cover the upper part with dry leaves or light litter.

eight or ten inches. A mulch of dry leaves or strawy litter may then be placed over this. The plants should not be protected until signs of freezing weather. A sure way to winter tender roses such as Hybrid Teas is to dig up the entire plant and bury the same in a deep trench, covering with soil and a heavy mulch of manure. This method delays flowering about ten days to two weeks.

Light wooden boxes may also be inverted over the plants which have been partly protected with earth. This prevents the rapid change of temperature from doing any severe damage to the stems. Although most climbing roses are very hardy, it is safer to give them some protection. If they are planted in a location where it is feasible to take the canes from the trellis, they may be laid on the ground and covered with dirt or straw. They should be promptly uncovered early in the spring before any growth has started. Hybrid Perpetuals and shrubby roses suggested for border and screen planting do not require any special protection.

TABLE IV

RECOMMENDED LIST OF ROSES FOR GENERAL PLANTING

Hybrid Perpetual roses

Mostly hardy without protection

Anna de Diesbach—red
Hugh Dickson—red
General Jacqueminot—crimson-scarlet
Frau Karl Druschki—white
Gloire Lyonnaise—cream
Mrs. John Laing—pink
Paul Neyron—pink
Baronne Prevost—rose
Baroness Rothschild—shell-pink
Magna Charta — pinkish-carmine
Prince Camille De Rohan—maroon
Ulrich Brunner—cherry-red
Francois Michelson—rose-lilac
Alfred Colomb—carmine-crimson

Rugosa and Hybrid Rugosa

Hardy without protection

Agnes—pale yellow
Alice Aldrich—light pink
Conrad Ferdinand Mayer—silvery-rose
F. J. Grootendorst—red-crimson
Rugosa alba—white
Rugosa rubra—red
Sir Thomas Lipton—white
Roseraie De L'Hay—dark red

Moss roses

Anni Welter—dark red
Little Gem—crimson
Salet—rose-pink
Crested Moss—light pink

TABLE IV—(*Continued*)

RECOMMENDED LIST OF ROSES FOR GENERAL PLANTING

Hybrid Tea roses

All require protection

Antoine Rivoire—cream-yellow
Duchess of Wellington—yellow
Ecarlate—light scarlet
Florence Pemberton—cream-white
General MacArthur—crimson
General-Superior Arnold Jaussen—bright crimson
Crüss an Teplitz—crimson-maroon
Jonkheer J. L. Mock—silvery-carmine
Kaiserin Auguste Viktoria—white
La France—bright pink
La Tosca—silvery-pink
Lady Ashtown—salmon-pink
Lady Pirrie—coppery-salmon
Lady Ursula—flesh-pink
Mme. Abel Chatenay—carmine-rose
Mme. Butterfly—rosy-flesh
Mme. Caroline Testout—satin-rose
Mme. Jules Bouche—white
Mme. Ravary—deep yellow
Mrs. Aaron Ward—Indian-yellow
Mrs. Wm. C. Egan—light pink
Ophelia—salmon-flesh
Pharisaer—silver-flesh
Prince De Bulgarie—rosy-flesh
Radiance—pink
Red Radiance—deep red
Robert Huey—carmine-cerise
Robin Hood—rosy-scarlet
Souvenir Du President Carnot—silver-flesh
Waltham Scarlet—crimson-scarlet

Dwarf Polyantha or Baby Rambler

Hardy with protection

Aennchen Miller—coral-pink
Chatillon—cerise-pink
Echo—light pink
Erna Teschendorff—deep red
George Elger—golden-yellow
Gruss an Aachen—flesh-pink
Jessie—cherry-crimson
Miss Edith Cavell—oxblood-red
Yvonne Rabier—white
Katharina Zeimet—white

Miscellaneous Hardy Bush roses

Require no protection

Austrian Briars

Austrian Copper—coppery-red
Austrian Yellow—clear yellow
Harison's Yellow—golden-yellow
Persian Yellow—golden-yellow

TABLE IV—(*Continued*)

RECOMMENDED LIST OF ROSES FOR GENERAL PLANTING

Sweetbriers

Rosa rubiginosa—light pink.
Bradwardine—clear pink
Lady Penzance—soft copper
Jeannie Deans—scarlet-crimson

Various hardy species

Centifolia—cabbage rose
Hugonis—deep yellow
Lucida—dark pink
Lucida alba—white
Rubrifolia—pink
Spinosissima—white.
Xanthina—yellow
Mme. Plantier—white

Climbing roses

Hardy without protection

Anna Maria—light pink
Beauty of the Prairies—red
Gem of the Prairies—red
Rosa setigera—rose-pink
Rosa Wichuraiana—white

Require protection for best results

American Pillar—pink-white
Baltimore Belle—blush
Bess Lovett—crimson
Christine Wright—rose-pink
Cl. American Beauty—rich pink
Crimson Rambler—crimson
Dr. W. VanFleet—flesh-pink
Dorothy Perkins—blush-pink
Excelsa—scarlet-crimson
Farquhar—bright pink
Goldfinch—yellow
Hiawatha—crimson-white
Mary Lovett—white
Paul's Scarlet Climber—scarlet-crimson
Prof. C. S. Sargent—yellow
Roserie—deep pink
Ruby Queen—red and white
Silvery Moon—white
Tausendschon—bright pink
Veilchenblau—light lilac
White Dorothy—white

CHAPTER VIII

BULBOUS PLANTS FOR THE GARDEN

Bulbs are specialized buds developed in some plants for food storage. These enlarged organs divide so readily that they form a most convenient way of propagating the species without resorting to the slow and very impractical seed method of reproduction. There are two main classes of bulbous plants, one featuring all hardy species, the other tender kinds. Hardy bulbs differ little from hardy herbaceous perennials in their garden behavior. Tender bulbs require planting each year, also storage in a frost-proof place during the winter months.

The cultivation of bulbous plants in specially designed and prepared formal beds and large gardens involves considerable expense and expert garden technique if carried out on an ample scale. This elaborate method is good in its place, but it is not necessarily the most satisfactory way of enjoying spring flowers. Every home lot has in it a few nooks and corners, which offer interesting places for the planting of tulips, hyacinths, narcissi, and crocus. Masses of bulbs in clusters or informal groups in front of shrubbery and between perennials and scattered plantings of crocus, snowdrops, scillas and narcissi along walks or drives and on the lawn under trees complete the spring garden picture.

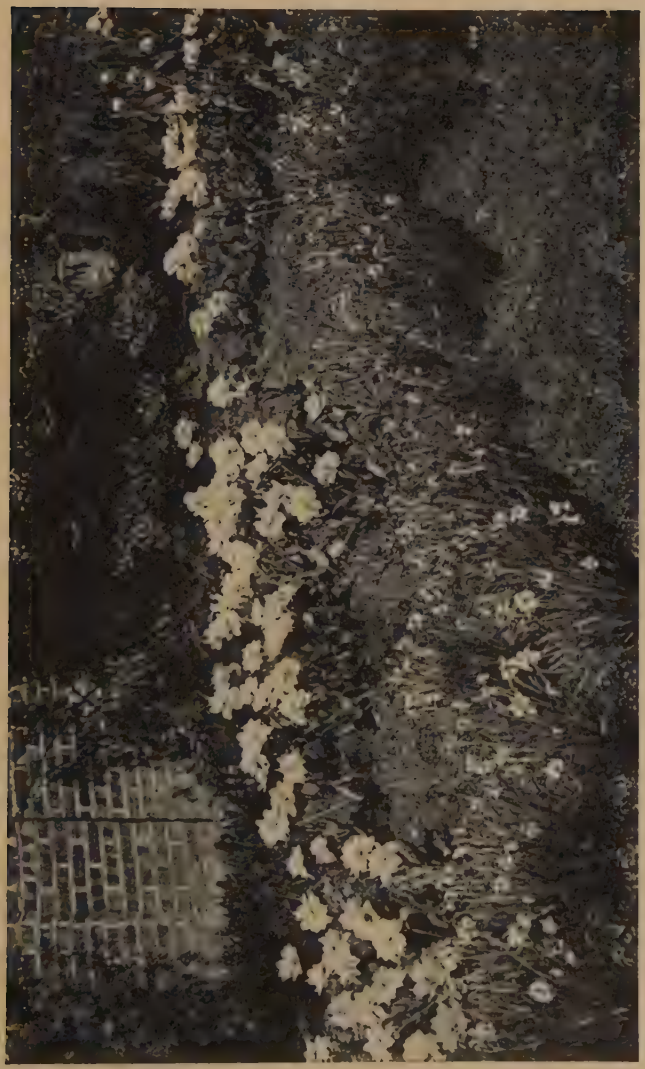

FIG. 54.—Short-crowned narcissus and double early tulips in happy combination.

SPRING-FLOWERING HARDY SPECIES

Narcissus (Family Amaryllidaceæ) (Figs. 1, 54)

Narcissi are native to central Europe, the Mediterranean region, and parts of Asia and China. There are approximately thirty species growing in a native state, but only ten have been considered of horticultural importance. Bulbs of narcissus were formerly imported largely from Europe. Now only American grown stock may be used due to the ban on certain plants by the Federal Horticultural Board. The garden varieties are classified according to the length of the crown or floral trumpet.

Long-crowned narcissi.—Crown as long or longer than perianth-segments and trumpet-shaped; *N. Pseudo-Narcissus*—Daffodils (many named varieties); *N. Bulbocodium*—Hoop-Petticoat Narcissus.

Medium-crowned narcissi.—Crown about half as long as the perianth-segments and cup-shaped. Star and teacup type of narcissus belong here. *N. incomparabilis*—Half-Skirt Narcissus; *N. Barrii*—many hybrid varieties; *N. Leedsii*—many hybrid varieties; *N. odorus*—Campernelle Narcissus.

Short-crowned narcissi.—Crown usually much less than half the length of the segments, mostly saucer-shaped; *N. poeticus*—Poets Narcissus; *N. Jonquilla*—True Jonquils; *N. Poetaz*—hybrid types; *N. Tazetta*—Paper-White Narcissus; *N. Tazetta* var. *orientalis*—Chinese Sacred Lily. Varieties of the *N. Tazetta* are not hardy and are suitable only for indoor culture.

Galanthus nivalis (Family Amaryllidaceæ)

Snowdrops are dwarf white-flowered early-flowering bulbs suitable for rock-gardens and borders.

Tulipa (Family Liliaceæ) (Figs. 55-57)

Only about half of the eighty species of tulips are in cultivation. Hybrid named varieties are now chiefly in vogue. Both foreign and American grown bulbs are on the market.

T. suaveolens—Early Tulips. Includes both single and double varieties in all colors.

FIG. 55.—Single early tulips are ideal for formal beds.

T. Gesneriana—Late Tulips. This species has given rise to several distinct strains of late tulips involving many named varieties. 12-36 inches.

Horticultural strains or types of late tulips are as follows:

Parrot type. Flowers blotched with yellow, red and green. Petals deeply cut or fringed.

Darwin type. Long stems, self-colored. Does not include yellow.

Breeder type. Darwin tulips in bronze, buff, and brown shades.

Cottage type. Similar to Darwin type, but segments longer and usually more pointed. Includes yellow, primrose, and other colors not found in Darwins. Originated in the famous Cottage Gardens of England.

Rembrandt, Bybloem, and *Bizarre Types.* These late

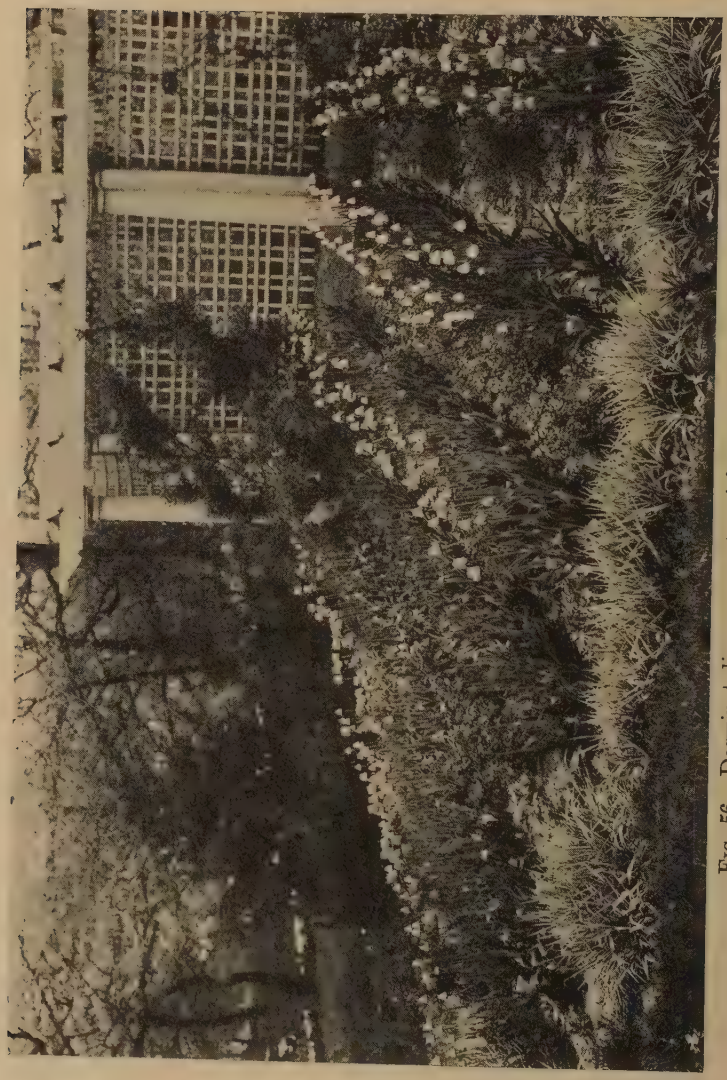

FIG. 56.—Darwin tulips are most satisfactory spring-flowering bulbs.

FIG. 57.—Pansies are the natural companion of tulips and other spring bulbs.

tulips are variegated, feathered, and striped in fancy colors. Belong in the novelty class.

Hyacinthus orientalis (Family Liliaceæ) (Fig. 58)

Dutch hyacinths have long dense racemes of funnel-shaped fragrant flowers, in many colors. They are fine for bedding, 10-12 inches in height.

Fritillaria (Family Liliaceæ)

F. meleagris—Checkered-Lily or Guinea-Hen Flower. Oddly marked bell-shaped flowers. 10-18 inches.

F. imperialis—Crown Imperial or Skunk-Lily. Lily-like plant with brilliant red or orange flowers. 2-3 feet.

Scilla sibirica (Family Liliaceæ)

The scilla or squill has typical blue flowers and is excellent for massing; height 6 inches.

Chionodoxa Luciliæ (Family Liliaceæ)

Glory-of-the-snow has brilliant blue flowers with white center; height 6 inches.

Muscari botryoides (Family Liliaceæ)

Grape-hyacinth has blue flowers and grows to a height of 6 inches.

Crocus vernus and *susianus* (Family Iridaceæ) (Fig. 59)

The common crocus has cormaceous bulbs, grass-like leaves, and blue, yellow or white flowers; height 6 inches.

Iris (Family Iridaceæ)

I. Xiphium, Spanish Iris, and *I. xiphioides*, English Iris, are bulbous species, 12-18 inches in height.

FIG. 58.—The fragrant hyacinth loses none of its beauty when grown out-of-doors.

Cultivation of spring-flowering bulbs

Bulbs will grow satisfactorily in any well-drained deeply spaded garden soil. Well-rotted barnyard manure is a good fertilizer, but the common mistake is to use heavy applications of fresh manure. If well-rotted manure is not available, bone-meal may be substituted.

Fig. 59.—The crocus feels at home in any garden setting.

The planting depth varies somewhat with the different bulbs, and care should be observed to get them deep enough. See Table V.

October is the ideal planting time for spring-flowering bulbs, but they may be set any time before freezing weather. Mulching the planted areas after the ground freezes is a benefit, provided the litter is removed early in the spring. The question is often asked, "How should bulbs be treated after flowering?" All bulbs flower better if left undisturbed in beds or borders for two or three years. If it is imperative that the bulbs be removed early after blooming, they

TABLE V

BULB PLANTING DEPTH AND DISTANCES

Kind of Bulb	*Depth to plant*	*Distance apart*	*Minimum No. of bulbs to plant for mass effect*
Narcissus (large)	5 inches	6-10 in.	12— 25
Narcissus (small)	3 inches	5- 6 in.	25— 50
Hyacinth	5 inches	6-10 in.	10— 20
Tulips	4 inches	5- 7 in.	12— 25
Scilla	3 inches	3- 4 in.	25— 50
Snowdrop	2 inches	3 in.	50—100
Crocus	3 inches	3- 4 in.	25— 50
Chionodoxa	3 inches	3- 4 in.	50—100
Muscari	3 inches	5- 6 in.	50—100

may be saved by digging the entire plants and heeling them in in an out-of-the-way place in the garden. When the tops are dry in August the dormant bulbs should be dug, cleaned and stored in a cool dry place until the usual fall planting time, when they are left undisturbed. Shallow-rooted annuals planted among the bulb areas will occupy the space left vacant by the withered tops of tulip, narcissus, and other bulbs.

HARDY GARDEN LILIES (Fig. 60)

Like the roses, lilies have been famous for hundreds of years in song, story and art, but as garden subjects they have been more or less neglected. It is difficult to explain why such truly beautiful and fragrant flowers have not caused as much of a stir in the garden world as the peony, the iris, or the rose. Lilies have scaly bulbs and there is a popular notion that on account of this they are difficult to manage successfully. The performance of both American and introduced species contradicts this statement.

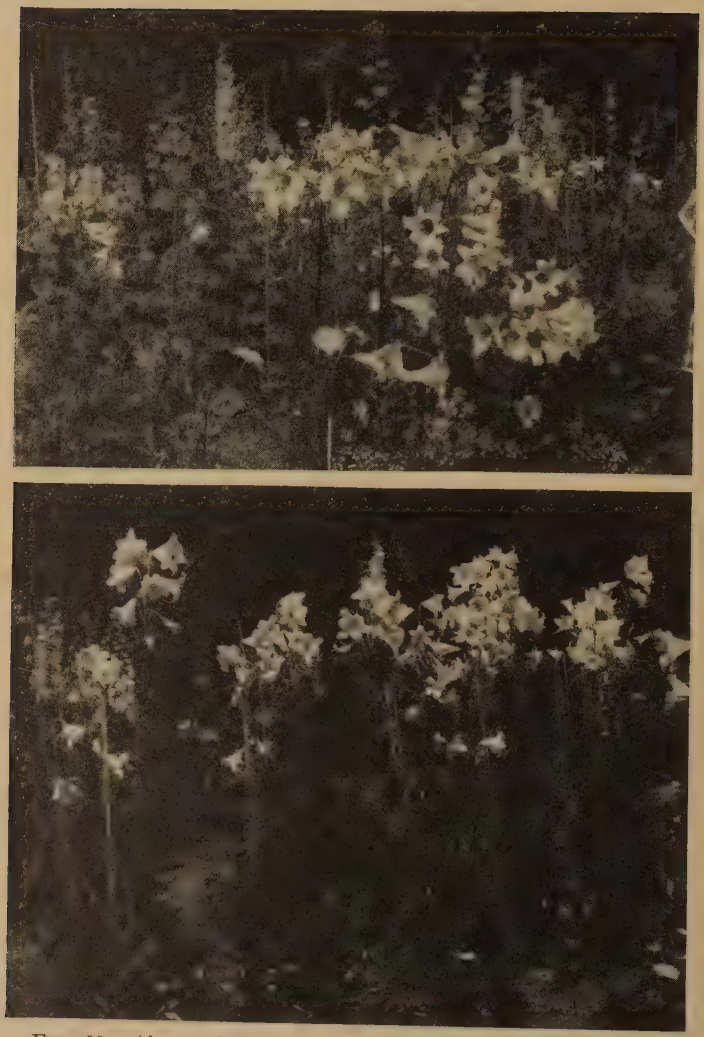

FIG. 60.—Above, larkspur as a background for regal lilies. Below, a mass planting of candidum and regal lilies.

A survey of the available species for garden culture shows that most of the showy types come from Asia and Japan. They are still in the original species form for the most part, as plant hybridizers have not produced many hybrid varieties. It would be difficult indeed to improve the natural species of this magnificent group of summer-flowering bulbs.

Important species

L. candidum—Madonna Lily. The best white hardy lily. The secret of successful culture lies in early fall planting (August or September) and not covering the bulbs too deeply. About four inches is sufficient.

L. regale (*L. myriophyllum*) — Regal Lily (Fig. 61). Flowers white, slightly suffused with pink, canary-yellow at center. A most popular species and readily grown from seed or bulbs.

L. *Sargentiæ*—Sargents Lily. Very beautiful, but rare and expensive. Greenish-white to purple on outside, white within.

L. Brownii — Browns Lily. Showy species. Large white flowers with purple outside.

Fig. 61.—The regal lily is a marvel for size and production of bloom.

L. longiflorum—Easter Lily. The white lily of the florists. Not considered hardy and bulbs should be stored in sand in cool cellar over winter. Bulbs from

cold storage planted very early in the spring will usually flower.

Open-flowered lilies

L. tigrinum—Tiger Lily. Well known and exceedingly hardy species. Single and double varieties are catalogued. Pronounced markings.

L. auratum—Japanese Gold-banded Lily. Most showy and fragrant, but may disappear in a few years. This failing may be corrected partially by planting only small and medium-sized bulbs. White and yellow.

L. speciosum—Speciosum Lily. Usually pink and white. Varieties *rubrum, album* and *Melpomene* are good.

L. testaceum—Nankeen Lily. A most graceful species and fine companion to the Madonna lily. Apricot.

L. Henryi—Henry Lily. A new very hardy Japanese lily. Orange.

Turban-shaped lilies

L. Martagon—European Turks-cap Lily. Clusters of purple wax-like flowers.

L. superbum—American Turks-cap Lily. Bright reddish-orange, conspicuously spotted.

Upright-flowered lilies

L. elegans—Upright Lily. A sturdy, stiff, upright, hardy, strong-growing lily. Red and yellow. Many varieties.

L. umbellatum—Western Orange-cup Lily. Resembles preceding species.

L. croceum—Orange Lily.

Miscellaneous garden species

Recent trials have added several novelties to the garden lily list. Included herewith are also some desirable old-time species.

L. canadense—Meadow Lily.

L. Hansoni—Hanson Lily.
L. tenuifolium—Coral Lily.
L. warleyense (*L. Willmottiæ*)—Wilmott Lily.

Cultivation of garden lilies

When providing space for lilies in the garden plan, it is difficult to put them out of place. They look well among low shrubbery, between clumps of peonies, or in a formal line on each side of the garden path. Native species are at home at the foot of trees and dwarf types in shaded nooks of the rock-garden. An essential in arrangement is to group the various kinds of lilies by themselves and not mix the species. In the culture of garden lilies, soil rich in vegetable matter is an advantage. Peat, leaf-mold, and sand may be added to the soil to give it proper texture. Root formation is always stronger in moist soils. The ideal time to plant lily bulbs falls into the period from August to October, depending on when the bulbs ripen. Imported bulbs may arrive as late as December. To plant such late arrivals it will be necessary to prevent the ground from freezing by means of a temporary cover of manure. Occasionally planting must be deferred until spring, but this should always be second choice. Cold-storage bulbs are always on sale in early spring and they are satisfactory if fall planting is not feasible. Planting depth for the bulbs varies from three to four inches for *Lilium candidum* and small species to ten and even twelve inches for the larger sorts, which produce roots on the stem above the bulb as well as below. In the last named group may be included *L. auratum, L. elegans, L. Hansoni, L. Henryi, L. regale, L. speciosum, L. tigrinum,* and *L. umbellatum.* When lilies are once established they

should be left undisturbed for a number of years. As a cool moist soil is so helpful to strong healthy root development, the area at the base of the plant should be shaded. This is accomplished by mulching with peat moss or lawn clippings. Shallow-rooted annuals or perennials planted among the lilies form a living mulch or ground-cover. A light mulch for winter protection in exposed places is also recommended. If vegetative growth of lilies starts very early in the spring, protection from late frosts may be necessary.

THE GLADIOLUS

Family, Iridaceæ; Genus, *Gladiolus;* Species, various (chiefly used for hybridizing purposes).

No garden flower can surpass the gladiolus in popularity. This summer- and autumn-flowering plant has had an amazing career and has literally taken the country by storm. Low cost, ease of culture, length of blooming season, and the excellent number of varieties are the chief causes. The native home of the gladiolus is South Africa, although a few species have been found in Europe and Asia. The several thousand named garden varieties are hybrid descendants of such original species as *G. cardinalis, G. primulinus, G. psittacinus, G. oppositiflorus, G. gandavensis* and others. The gladiolus is at its best as a cut-flower. It is well adapted for exhibition purposes, especially amateur flower-shows. In the ornamental garden gladioli should be planted in bold masses. Clumps of the stately flower combine well with annuals and some perennials in mixed plantings. Borders featuring tulips, iris and gladioli will provide a charming succession of bloom. If planted for bloom in the garden, the plants must always be kept in a neat

condition. There is nothing so unsightly as a clump of gladiolus spikes full of ragged and wilted blooms.

Garden types

New varieties are being developed so rapidly by the host of gladiolus fanciers that any list of named sorts would soon be out of date. No attempt at such a list will be made in connection with this discussion; however, attention should be called to the several distinct types of garden varieties. This classification is based largely on petal formation regardless of color.

Plain-petaled type.—The individual flowers in this class are mostly large with full open centers. Petals perfectly plain and smooth. Examples of this class include such popular varieties as Mrs. Frank Pendleton, America, Anna Eberius, Peace and Red Amaryllis.

Ruffled type.—Flowers large as in preceding class, but petals distinctly ruffled. Examples: Purple Glory, Marie Kunderd, Joe Coleman, Masterpiece and Rose Glory.

Primulinus type.—Often spoken of as the Butterfly type. Flowers usually small and partly hooded. Spikes very graceful and dainty as flowers are further apart on the stems. Examples: Butterfly, Cinderella, Alice Tiplady, Sonia, and Ming Toy.

Laciniated type.—A comparatively new type of gladiolus. Flowers large and open. Petals deeply cut. The variety Laciniatus is the outstanding novelty in this group.

Propagation

The gladiolus may be propagated by seed, corms, and cormels. The former is not suitable for home-gardeners as seeds give rise to so many variations. They will not come true to the parent stock on account of their hybrid or mixed origin. Most seedlings are so very inferior to

the standard named varieties that it is likely to be very discouraging to the beginner. It also requires about three or four years to produce flowers from seed. Corms, which are usually called bulbs, are the usual method of garden propagation. Each corm planted gives rise to one or more new corms for planting the next year. Cormels or bulblets are tiny corms formed at the base of the new corms. They are given the same care as mature corms except that they are planted only about one inch deep. Early planting and soaking of cormels are advisable for strong development.

Cultivation

A sandy loam soil is ideal for gladiolus. The planting season extends from early spring until the end of June. Early planting encourages corm and cormel formation. It is a good plan to start a new batch of corms every ten days to assure a succession of bloom. With this method the flowering season will extend from July to October. Bone-meal or any good potato fertilizer can be used for additional plant-food. Well-rotted manure, if thoroughly incorporated with the soil, is also good. The planting depth for gladiolus corms varies from four inches on heavy soil to seven inches on light sandy soil. Deep planting usually obviates the necessity of tying the spikes to stakes or other supports. Only clean healthy corms should be planted and if there is any cause to suspect the presence of fungous diseases, it is advisable to disinfect the corms before planting. Soaking for two hours in a solution of one pint of formaldehyde in thirty gallons of water is the standard remedy. As with other flowers which are planted each season, rotation of crops or the providing of a new location is

FIG. 62.—Decorative dahlia. This plant shows the value of pruning.

sound practice. Fall and winter care consists of digging the plants before the corms are injured by freezing. If possible a part of the tops should be left attached to the corms for several weeks until they are dry enough to clean readily. The clean corms and cormels are then placed in flat boxes or trays and stored in a cool dry place. The ideal temperature for storage is about 40 degrees Fahrenheit. Both in planting and handling in storage precautions should be taken to keep named varieties from becoming mixed.

THE DAHLIA (Figs. 62, 63)

Family, Compositæ; Genus, *Dahlia;* Species, various.

FIG. 63.—A rather unusual support for dahlias, affording partial protection from wind and sun.

Dahlias, named in honor of the Swedish botanist "Dahl," are tuberous-rooted tender perennials. When grown in the North the tuberous roots are stored in a protected place. The similarity of the roots to bulbs is the chief reason for classifying dahlias with the bulbous flowers. The bloom, like the gladiolus, lacks fragrance, but has so many other charming attributes that it has become one of the important late summer garden flowers. The rather coarse foliage and the customary use of stakes for support does not help the standing of the dahlia as a landscape subject. The best place to grow this flower is in the cut-flower garden, where all cultural requirements may be administered without detracting from general appearances. Dahlias are fine cut-flowers and, therefore, well adapted for exhibitions. No garden flower can present such an array of color or variation in form and size of blossoms.

Classification of garden varieties .

As with the gladiolus, it is impossible to present a list of varieties. In the classification following the important garden types are defined and examples cited. This classification is in accord with the types recognized by the American Dahlia Society.

I. *Cactus Dahlias*

A. *True Fluted type.*—Flowers fully double; floral rays ("petals") long, narrow, incurved or twisted with sharp divided or fluted points and with revolute ("rolled back") margins, forming, in the outer florets, a more or less perfect tube for more than half the length of the ray. Typical examples: Golden West and Countess of Lonsdale.

B. *Hybrid Cactus or Semi-Cactus type.*—Flowers

fully double; floral rays ("petals") short as compared with previous type, broad, flat, recurved or twisted, not sharply pointed except when tips are divided ("stag-horn"), margins only slightly revolute ("rolled back"), and tubes of outer florets, if any, less than half the length of the ray. Typical examples: California Enchantress, Helen Durnbaugh.

II. *Decorative Dahlias*

Double flowers, full to center in early season, flat rather than ball-shaped, with broad flat somewhat loosely arranged floral rays ("petals") with broad points or rounded tips which are straight or decurved (turned down or back), not incurved, and with margins revolute (rolled back) if rolled at all. Typical examples: Millionaire, Pride of California.

III. *Ball-shaped Double Dahlias*

A. *Show type.*—Double flowers, globular or ball-shaped rather than broad or flat, full to center, showing regular spiral arrangement of florets; floral rays more or less quilled or with markedly involute (rolled in) margins and rounded tips. Typical examples: A. D. Livoni, May Lomas.

B. *Hybrid Show, Giant Show or Colossal type.*—Flowers fully double, broadly hemispherical to flatly globular in form, loosely built so spiral arrangement of florets is not immediately evident, floral rays ("petals") broad, heavy, cupped or quilled, with rounded tips and involute (rolled in or forward) margins. Typical examples: Le Colosse, Mrs. Roosevelt.

C. *Pompon type.*—Shape and color may be same as of A, B; but must be under two inches in diameter. Typical examples: Sea Shell, Little Prince.

IV. *Peony-flowered or "Art" Dahlias*

Semi-double flowers with open center, the inner floral rays ("petals") being usually curled or twisted, the other

or outer petals being either flat or more or less irregular. Typical examples: Insulinde, Mrs. Jessie Seal.

V. *Duplex Dahlias*

Semi-double flowers, with center always exposed on opening of bud, with petals in more than one row, more than 12, long and flat, or broad and rounded, not noticeably twisted or curled. (Many so-called peony-flowered dahlias belong here.) Typical examples: Big Chief, Merry Widow.

VI. *Single Dahlias*

Open-centered flowers, small to very large, with eight to twelve floral rays ("petals") more or less in one circle, margins often decurved (turned down or back). There are no distinctions as to colors. The type embraces the large Twentieth Century as well as the smaller English varieties. Typical examples: White Century, Danish Cross.

The Star singles and Cactus singles are omitted from the present classification scheme as not being sufficiently numerous or well defined yet.

VII. *Collarette Dahlias*

Open-centered blossoms with not more than nine floral rays ("petals") with one or more smaller rays, usually of a different color, from heart of each ray floret, making a collar about the disk.

VIII. *Anemone-flowered Dahlias*

Flowers with one row of large floral rays ("petals") like single dahlias, but with each disk-flower producing small tubular petals. Includes such forms as those of Graziella and Mme. Pierre Dupont.

IX. *Other Sections*

Includes: Miniature or Pompon Cactus, dwarf bushy singles, bedding dahlias, Cockade or Zonal dahlias.

Propagation

The clumps of dahlia tubers may be divided in the spring after the buds or eyes begin to show. It is necessary that each tuber have an eye so the dividing must be done carefully with a sharp knife.

When greenhouse equipment is available, clumps may be started by planting in soil or sand in March or early April. Cuttings made from the numerous young shoots will root readily in sand. When rooted the young plants may be grown in pots until time to transplant to the garden.

Seeds saved from hybrid varieties will not produce plants true to type, but many interesting types may be started in this manner. It is a good way to propagate single dahlias. The plants from seed will bloom as readily as from tubers if sown in the greenhouse or hotbed in March.

Cultivation of dahlias

Light sandy soils are more desirable for dahlias than very heavy soils. The latter may be improved by liberal applications of sand or sifted coal-ashes. Late planting is better than too early and in northern zones the ideal time is from the middle of May to June 1st. In planting divided tubers, they should be placed on their sides in an opening large enough so that the eye may be covered with five or six inches of soil, cover lightly at first and fill in gradually as plants grow. Only one tuber or potted plant should be used in a place and the distance between plants should range from two and one-half to four feet. Stout stakes should be provided for strong growing varieties and soft jute twine

or tape used for tying purposes. Pruning is practiced to increase the height of plant and length of flowering stems. Fewer but larger and better blooms are the result of careful pruning of side shoots. Disbudding also helps to increase size of flower and length of stem. This process involves the removal of all buds except one on each branch. Disbudding must be practiced frequently as new buds are constantly forming. It is most effective if the buds are removed when quite small.

Diseases and insects

The dahlia is occasionally infested with serious insects and diseases and the gardener should be on a constant lookout for them.

The stalk-borer digs its way into the stem of the plant, feeding as it goes. The only remedy is removal of the worm by inserting a small copper wire into the opening or by slitting the stem with a sharp knife. This operation is not fatal to the plant as the wound promptly heals if bandaged with cloth.

Aphis or lice should be sprayed with nicotine sulfate.

Red-spider can be controlled by syringing forcefully with water.

Mildew causes a white fungus on foliage. Control is effected by dusting with powdered sulfur or spraying with bordeaux mixture.

When infected with "stunt" disease the plants refuse to grow. The foliage has a yellowish sickly appearance. The disease is evidently carried from one plant to another by insects such as aphis and leaf-hoppers. Regular spraying with bordeaux mixture about once a week during the growing season is good insurance in the dahlia

garden. The bordeaux seems to repel the insects and, therefore, indirectly controls the disease.

Winter care of tubers

After the first killing frosts have blackened the foliage, the clumps of tubers should be dug. Before digging the tops should be cut off with pruning-shears about four or six inches above the ground, the tubers exposed to sun and air a few hours and then placed in storage-room packed in boxes of dry sand, sawdust or granulated peat moss to prevent shriveling. The tubers seem to keep better if packed stems down. A temperature of 40 to 45 degrees Fahrenheit is about right.

CANNAS

Cannas are tropical foliage plants grown both for flowers and beautiful foliage. Modern hybrid varieties are a great improvement over the original type. Red and yellow seem to be the favorite colors, but the growing of some of the fine pink and white varieties should be encouraged. Cannas make a quick growth and bloom continually throughout the season. When a tropical effect and bright colors are desirable, cannas will undoubtedly meet the requirement.

Green-leaved varieties

White		*Pink*	
Eureka	4½ feet	Hungaria	3½ feet
Flag of Truce	4 feet	City of Portland	3½ feet
		Mrs. Alfred Conard	4 feet
Red		*Yellow*	
Cheerfulness	3½ feet	Queen Helene	4 feet
Meteor	4 feet	San Diego	4 feet
Firebird	4½ feet	Indiana	4½ feet
Pennsylvania	5 feet	Florence Vaughan	4 feet

Bronze-leaved varieties

David Harum—scarlet ..... 3½ feet
King Humbert—orange scarlet..... 4 feet
Wyoming—yellow ..... 4½ feet
Ambassadeur—scarlet ..... 4 feet

Propagation and culture

Seeds, as a rule, do not come true to type and the only reliable method of propagation is division of the stool or clump. The enlarged tubers are cut into pieces three to five inches long. Each division should have one or two eyes and should be planted about one and one-half to two feet apart each way. Planting is best deferred until warm weather is assured. In order to get a start with cannas, potted plants may be purchased from florists or seedsmen. Potted stock is also useful for an immediate effect. Canna tubers or roots are stored at the same temperature as dahlia tubers. They must not be allowed to shrivel by contact with dry or warm air.

MISCELLANEOUS TENDER BULBS FOR SUMMER FLOWERING

Colocasia esculenta (*Caladium*)—Elephant-Ear Plant. Tender perennial with ornamental foliage. Bulbs may be stored in a warm place and kept dormant over winter.

Galtonia candicans—Summer-Hyacinth. Numerous bell-shaped white flowers on stalks two to four feet high. Plant in spring. Advisable to buy new stock each year as they are inexpensive.

Hymenocallis or *Ismene calathina*—Peruvian Daffodil. Large pure white flowers, resembling amaryllis. Very fragrant. Store bulbs in sand.

Polianthes tuberosa—Tuberose. Single or double white fragrant flowers. Bulbs may be stored in dry place, but are so cheap that it pays to buy new stock each year.

Sprekelia formosissima—Jacobean-Lily. Showy crim-

son flowers. Plant dormant bulbs in May. Will bloom in four weeks.

Tigridia Pavonia—Tiger-Flower. Highly colored flowers, from Mexico, orange-red and yellow. Blooms over a period of several months. Store bulbs by hanging in bunches in cellar to keep dry and prevent injury by mice.

Tritonia crocosmæflora—Montbretia. Orange or red flowers from July until frost. Store bulbs in dry sand.

Watsonia humilis—Watsonia. Tall showy plants resembling gladioli and requiring similar culture.

CHAPTER IX

GARDEN FLOWERS FOR SPECIAL PURPOSES

SPECIALIZED gardens are always interesting, whether they are rock-gardens, water- or aquatic-gardens, or are devoted to wild plants. One should select only the species suited to the conditions.

ROCK-GARDENS (Fig. 64)

The primary purpose of a rock-garden is to furnish a natural and suitable place for the growing of mountain plants commonly spoken of as "alpines." Mountain plants are different from lowland species and, as a rule. they are not only interesting but distinctly beautiful and worthy of the special effort required to grow them. There is a mistaken notion that so-called rockeries or rock-gardens are only intended for large areas where unlimited resources are at hand. Small rock-gardens are not only practicable but, if carefully planned, may be constructed and planted without great expense. Not all gardens are suited to rockery development, but in spite of this fact some enthusiasts are not content until they construct one. The result is either a misfit or in some cases even a monstrosity. A mound of rocks piled up where grass ought to grow on a perfectly level area does not help the scenery nor can it be called a success as a rock-garden. The latter, if well considered, is in reality a miniature mountain scene and requires a nat-

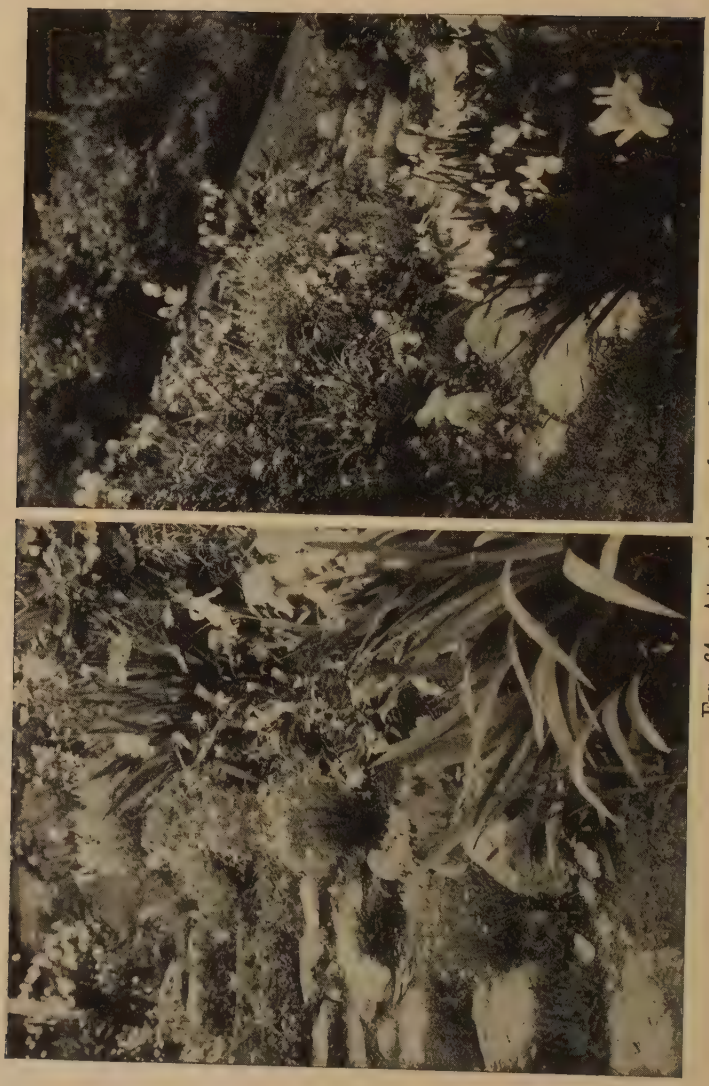

Fig. 64.—Attractive rock-gardens.

ural undulating or hilly situation. In short, the rockery should appear as a part of the natural surroundings. From the practical standpoint one should also take into consideration cultural requirements of the plants to be grown. Locating the rock-garden too near large trees is dangerous, as the roots would play havoc with the soil pockets intended for the rock plants. Low wet areas may be helped by drainage and often a bog-garden may be included with the rockery. Alpine or rock-garden plants differ in their ability to tolerate sun or shade and various soil types. Soil requirements are the least important.

Suggestions on construction

Unless the garden is small and the plan simple, it is best to hire the services of an expert. Natural rocks are always more attractive and also better adapted to the plants than artificially made boulders and stones. In placing the rocks the natural stratification should be maintained uniformly throughout regardless of the size of the boulders. The moisture supply in the rockery depends largely on proper facing of the boulders. The outer faces should be slightly tilted to catch as much of the rainfall as possible. In their native habitat, mountain plants grow luxuriantly upon shelf-like rocks. This should be imitated as far as possible in the rockery. These lessons from nature also teach us not to work in artificial concrete steps, garden furniture, or anything foreign to an alpine setting. Before any rocks are set, the drainage should be considered carefully. If soil is added to the natural supply in order to fill crevices in which the plants are to grow, it should consist of loam, leaf-mold, crumbled mortar and some sand, all thor-

TABLE VI

PERENNIAL ROCK-GARDEN PLANTS

Botanical Name	*Common Name*	*Height in inches*	*Color*	*Blooming Season*
Achillea Ageratum	Sweet Yarrow	10	Yellow	Spring & summer
Achillea tomentosa	Woolly Yarrow	6	Yellow	July
Adonis amurensis	Amur Adonis		Yellow	Spring
Ægopodium Podograria var. variegatum	Silver-edged Goutweed	12-14	White	Late May to June
Ajuga reptans	Carpet Bugle	6	Purple	May
Alyssum rostratum	Yellowhead Alyssum	20	Yellow to orange	June
Alyssum saxatile var. compactum	Goldentuft	12	Yellow	May
Anchusa myosotidiflora	Siberian Bugloss	12	Bright blue	May-June
Anemone canadensis	Wind-Flower	4- 6	White	April
Anemone Pulsatilla	European Pasque-flower	12-18	Purple	April-May
Anemone sylvestris	Wood Anemone	18	White	April-June
Aquilegia alpina var. superba	Alpine Columbine	6-12	Blue and white	May-July
Aquilegia cœrulea	Colorado Columbine	6-12	Blue and white	May-July
Aquilegia canadensis	American Columbine	12-24	Scarlet	Late April
Aquilegia chrysantha	Golden Columbine	36-48	Yellow	Late May to Aug.
Aquilegia Skinneri	Mexican Columbine	12-24	Red	July-Sept.
Aquilegia vulgaris var. nivea	Munstead White Columbine	24-36	White	April
Arabis alpina var. flore-pleno	Double Rock-Cress	6	White	Early April-May
Arenaria montana	Mountain Sandwort	1	White	June-Aug.
Artemisia Stelleriana	Beach Wormwood	24	White	Summer
Aster alpinus	Rock Aster	6- 9	Blue and white	June-July

Aster alpinus var. albus	White Rock Aster	6- 9	Blue and white	June-July
Bellis perennis	English Daisy	4- 6	Pink and white	June
Brunella Webbiana	Webb Self-Heal	1- 5	Bright purple	June-Sept.
Campanula carpatica (Fig. 65)	Carpathian Bellflower	9-18	Violet	Late June-Aug.
Campanula rotundifolia	English Harebell	6-12	Violet	June-late Aug.
Cerastium tomentosum	Snow-in-Summer	3- 6	White	June
Cheiranthus Allionii	Wallflower	12	Orange	May-June
Chrysanthemum arcticum	Arctic Chrysanthemum	3-15	White	Autumn
Convallaria majalis	Lily-of-the-Valley	8	White	Mid May-mid. June
Crucianella stylosa	Common Crosswort	6- 9	Pink	June-Sept.
Delphinium grandiflorum var. chinense	Chinese Larkspur	12-24	Blue to white	June-July
Dianthus barbatus	Sweet William	10-18	Red, rose, purple, white	June-July
Dianthus deltoides (Fig. 65)	Maiden Pink	6-10	Deep pink	May-June
Dianthus plumarius	Scotch Pink	8-12	Pink	June
Dicentra formosa	Western Bleeding-Heart	12	Rose	Late May-June
Erigeron bellidifolius	Poor Robins Plantain	12	Bluish-purple	May-June
Erinus alpinus	Alpine Liver Balsam	3- 4	Violet-purple	May-June
Erysimum pulchellum	Rockery Blister-Cress	6- 8	Yellow	May-early June
Euphorbia Cyparissias	Cypress Spurge	Spreading	Dark green	None
Euphorbia epithymoides	Cushion Spurge	12	Yellow	May
Ferns, native				
Filipendula hexapetala var. flore-pleno	Dropwort	12-30	Yellowish-white	June-early July
Gentiana Andrewsii	Closed Gentian	24	Deep blue	Aug.-Sept.

TABLE VI—(*Continued*)

PERENNIAL ROCK-GARDEN PLANTS

Botanical Name	*Common Name*	*Height in inches*	*Color*	*Blooming Season*
Geranium maculatum	Spotted Cranesbill	12-18	Lavender	Early May-July
Geranium Robertianum	Herb Robert	9	Bright crimson	June-Oct.
Geranium sanguineum	Red Cranesbill	18	Blood-red	June-Aug.
Geum chiloense (G. atro-sanguineum)	Avens	12	Deep red	June-July
Gypsophila repens	Creeping Gypsophila	6	Pale pink	Early June-mid. July
Helianthemum apenninum var. roseum	Rock-Rose		Pink	July-Sept.
Helianthemum Chamæcistus	Rock-Rose	Procumbent	White	July-Sept.
Helianthemum various species	Rock-Rose			
Helleborus niger	Christmas-Rose	6- 8	White	Mar.-early April
Hepatica triloba	Round-lobe Hepatica	4- 6	Bluish	April-early May
Heuchera sanguinea	Coral Bells	24	Crimson	June-late Sept.
Heuchera in varieties		24	Various	June-Sept.
Hieracium aurantiacum	Orange Hawkweed	6-24	Orange	June-Oct.
Iberis sempervirens	Evergreen Candytuft	9-15	White	May-early June
Incarvillea Delavayi	Delavays Incarvillea	12-24	Purplish-rose	Early June-July
Iris cristata	Crested Iris	4- 9	Pale lilac	Late May
Iris pumila var. cyanea	Dwarf Iris	9	Blue	April-May
Iris pumila in variety	Dwarf Iris	9	Various	April-May
Lavandula Spica (L. vera)	Lavender	12-36	Violet	Mid. July-Sept.
Leontopodium alpinum	Edelweiss	4-12	Yellow	June-July

Linaria Cymbalaria (properly Cymbalaria muralis)	Kenilworth-Ivy	4	Lilac	June-Sept.
Linaria vulgaris	Butter-and-Eggs	12-36	Yellow and orange	
Linum flavum	Yellow Flax	12-24	Yellow	June-July
Lychnis alpina	Red Alpine Campion	6-12	Pink	Late April-May
Lychnis Haageana	Haage Campion	8-12	Red	Early June Early Aug.
Lychnis Viscaria var. splendens	German Catchfly	6-20	Rosy-red	Mid. May-June
Lysimachia Nummularia	Moneywort, Creeping Jenny	1- 2	Yellow	June-late July
Mertensia virginica	Virginia Bluebells	12-24	Deep blue	Late April-May
Myosotis in variety	Forget-Me-Not	6-12	Blue	May-early June
Nepeta Mussini	Mussins Catmint	24	Violet	July-Aug.
Œnothera missouriensis	Missouri Primrose	10	Yellow	June-early Aug.
Opuntia humifusa (O. Rafinesquii)	Western Prickly-Pear	12	Golden-yellow	July-Aug.
Orchids, native			Various colors	May-June
Pachysandra terminalis	Japanese Pachysandra	6-12	White	Late May-mid. June
Papaver nudicaule	Iceland Poppy	9-15	Yellow	April-July Aug.-Oct.
Phalaris arundinacea var. picta	Reed Canary-Grass	12-24	White	Aug.
Phlox amœna	Hairy Phlox	4- 6	Pink	Late April-May
Phlox divaricata	Blue Phlox	10-18	Bluish-lilac	May
Phlox ovata (P. carolina)	Carolina Phlox	12-30	Deep rose	June-July
Phlox subulata var. alba	White Moss- or Ground-Pink	4- 6	White	Late April-May
Phlox subulata var. lilacina	Lilac Moss-Pink	4- 6	Pale lilac	Late April-May

TABLE VI—(*Continued*)

PERENNIAL ROCK-GARDEN PLANTS

Botanical Name	*Common Name*	*Height in inches*	*Color*	*Blooming Season*
Phlox subulata var. rosea	Moss-Pink	2- 6	Light blue, pink or white	Late April-Oct.
Plumbago Larpentæ (properly Ceratostigma plumbaginoides)	Blue-flowered Leadwort	6-12	Cobalt-blue	Late Aug.-Sept.
Podophyllum peltatum	May Apple	12-15	White	Late May-June
Polemonium reptans	Greek Valerian	6- 8	Light blue	Late April-late May
Primula in variety	Primrose	12	Various	May-June
Pulmonaria saccharata	Bethlehem-Sage	6-18	Blue	Late April-May
Ranunculus repens	Creeping Buttercup	6-12	Yellow	May-Aug.
Sanguinaria canadensis	Bloodroot	8	White	Early April-mid. May
Saponaria ocymoides	Rock Soapwort	6- 9	Pink	Late May-Aug.
Saxifraga in variety	Saxifrage			
Sedum album	White Stonecrop	4- 6	Cream-white	Mid. July-late Aug.
Sedum Middendorffianum	Middendorff Stonecrop	4	Yellow	June-July
Sedum sexangulare	Hexagon Stonecrop	3- 6	Yellow	Early June-July
Sedum spectabile	Showy Stonecrop	18-24	Rose	Late Aug.-mid. Sept.
Sedum stoloniferum	Purple Stonecrop	18-24	Purplish-pink	Mid. July-early Aug.

Sempervivum in variety	Houseleek			
Stachys lanata	Woolly Woundwort	12-18	Purple	Mid. June-July
Statice latifolia (properly Limonium latifolium)	Broad-leaved Sea-Lavender	18-24	Bluish-purple	Late July-early Sept.
Stokesia lævis (S. cyanea)	Stokes Aster		Blue	Aug.-early Oct.
Stokesia lævis var. alba	Stokes Aster	12-18	White	Aug.-early Oct.
Teucrium canadense	American Germander	12-36	Purplish	Late July-Aug.
Thymus Serpyllum	Mother-of-Thyme	1- 2	Pale lilac	June-July
Thymus Serpyllum var. lanuginosus	Woolly Thyme	1- 2	Pale lilac	June-July
Thymus vulgaris	Common Thyme	1- 2	Pale lilac	June-July
Tiarella cordifolia	Foam-Flower	6-12	White	May
Trillium erectum	Purple Trillium	12	Brownish-red	Late April-early June
Trillium grandiflorum	Large-flowered Wake-Robin	9-12	White	May-early June
Trollius europæus	Globe-Flower	6-15	Yellow	Early May-June
Tunica Saxifraga	Saxifrage Tunic-Flower	6-10	Pink	June-July
Veronica incana	Hoary Speedwell	12-24	Blue	Mid. June-late July
Veronica repens	Creeping Speedwell	Prostrate	Bluish-white	May
Veronica rupestris	Rock Speedwell	4- 5	Purplish	Mid. May-late June
Vinca minor	Common Periwinkle	6-10	Lilac-blue	June
Vinca minor var. alba	White Periwinkle	6-10	White	June
Viola cornuta	Tufted Pansy	5- 8	Violet	Mid. May
Yucca filamentosa	Common Yucca	72	Creamy-white	June-July

FIG. 65.—Above, *Dianthus deltoides.* Below, *Campanula carpatica.*

TABLE VII

BULBOUS PLANTS FOR THE ROCK-GARDEN

Chionodoxa Luciliæ—Glory-of-the-Snow
Colchicum autumnale—Fall Crocus
Crocus susianus—Cloth-of-Gold
Crocus vernus—Spring Crocus
Fritillaria imperialis—Crown Imperial
Fritillaria meleagris—Guinea-Hen Flower
Galanthus Elwesii—Elwes Snowdrop
Muscari botryoides—Grape-Hyacinth
Narcissus—Small- and intermediate-flowered types
Puschkinia scilloides var. libanotica—Striped Squill
Scilla hispanica (S. campanulata)—Squill
Scilla sibirica—Siberian Squill
Tulipa Clusiana

TABLE VIII

ANNUALS FOR THE ROCK-GARDEN

Abronia umbellata—Sand-Verbena—rose, white
Ageratum Houstonianum—Floss-Flower—blue, white
Alyssum maritimum or Lobularia maritima—Sweet Alyssum—white, lilac
Anagallis linifolia—Pimpernel—various
Calandrinia grandiflora—Rock-Purslane—rose
Gilia tricolor and other species—Gilia—various
Nemophila insignis—Baby-Blue-Eyes—blue and white
Nierembergia gracilis—Cup-Flower—white
Portulaca grandiflora—Rose-Moss—various
Phlox Drummondii—Annual Phlox—various
Sanvitalia procumbens—Sanvitalia—yellow
Verbena erinoides—purplish-rose
Verbena venosa—purple
Zinnia Haageana—Orange Zinnia—yellow, orange.

oughly mixed together. The proper planting of rock-garden material is too often neglected. Firming the soil about the roots is most essential.

Plant material for rock-gardens

True alpines for the most part are hardy herbaceous perennials. The list is long and careful selection will

make possible a long season of bloom, including many colors and types of flowers. A number of nurseries are now specializing in alpines and they constitute the most reliable source of plants. For the beginner who may wish to use some annuals for temporary effect, a brief list of suitable kinds is included. (See Tables VI-VIII, pages 170-177.)

WILD-GARDENS

The growing of favorite native plants in situations suited to their needs is to be commended, providing the gardener does not devastate natural woodlands or meadows in securing his planting stock. The conservation of wild flowers should have the whole-hearted support of all flower lovers. The proper place to enjoy native plants is in their natural environment. However, it is no crime to enjoy them in the home-garden if they are given good care and if the natural supply is not depleted in securing the stock. An ideal source of wild flowering plants is one of the many nurseries now specializing in just such material. Spring-blooming plants are by far the most numerous. One may make a choice from a big list but the most popular wild flowers include anemones, bellwort, bluets, cranesbill, creeping Jenny, dog-tooth violets, Dutchmans-breeches, hepatica, jack-in-the-pulpit, native orchids, marsh-marigold, May apple, phlox, Queen Annes lace (Fig. 66), shooting-star, Solomons seal, squirrel-corn, spring beauty, trillium, turtlehead, and violets. Spring wild flowers love sun early in the season but prefer some shade as hot weather comes on. Ferns of all kinds are at home in the wild-garden and they too are shade-loving.

WATER-GARDENS (Figs. 67-69)

The human love for water in the form of lakes, ponds, or rivers has found expression in numerous pools or water-gardens. There is something fascinating and extremely satisfying in being the owner of such a water-

FIG. 66.—Queen Annes lace is adequately fitted to the needs of the wild-garden in midsummer. Note the size of the blooms when grown as a cultivated plant.

garden. The plant and animal life made possible by this backyard environment is out of the ordinary and, therefore, plays an important part in finding new devotees for this type of gardening. Water-gardens need not be expensive, as a sunken half-barrel or tub growing

one water-lily plant and a few of the smaller aquatics can suffice.

Suggestions on construction

Water-gardens, whether large or small, should fit into the landscape and become a natural part of it. There-

Fig. 67.—The water-lily is the queen of all aquatic plants.

fore, the selection of a proper site is very important. Among the first factors to consider are water supply, lay of the land, and points from which the pool may be viewed. On extensive home grounds low swampy places, natural ponds, small streams, and even ditches can be

transformed into beautiful aquatic gardens. All are useful in adding interest to the home surroundings.

In the construction of artificial ponds an absolutely tight bottom is necessary. If the natural clay left by the excavating can be puddled to make it impervious to water, such construction will be satisfactory. Otherwise concrete walls and bottom should be used. Construction engineers advise concrete, when properly reinforced and poured to a thickness capable of withstanding the effects of winter freezing.

When planning a pool for an informal setting, an irregular outline will be more pleasing than the formal round, oval, or rectangular shape so well suited to pools which are to become a part of a formal garden layout. With the informal or irregular pool it is advisable to keep the top of the retaining walls five or six inches below grade. Careful finishing and grading with such construction adds to the natural appearance of the pool. In formal construction a coping of tile, brick, concrete, or rocks may be carried slightly above the grade to emphasize the shape of the pool. In climates registering severe winter temperatures, round or oval pools with dished or sloping sides will crack less readily than those with square corners.

Planting and care

The depth of the water in the pond or basin may vary from four inches to four feet. Twelve to eighteen inches of water will give sufficient depth for the growing of hardy water-lilies but strong-growing species will require two or more feet of water. To secure best results the water should never be cold. Even the hardy lilies require a temperature of 70 degrees while 80 degrees

Fahrenheit is better suited to the tender types. Victorias or royal water-lilies are so sensitive to cold water that some means of artificially heating to a uniform temperature of 85 to 90 degrees is necessary. The addition of fresh water should, in all events, be very gradual

Fig. 68.—A well-designed informal pool.

to overcome sudden chilling of the plants. Fountains or spray arrangements are useful to replenish the water supply, but a continuous spraying of the plants will cut off the air supply of the leaves and cause serious injury or death.

Aquatic plants and in particular water-lilies need a specially prepared soil for maximum growth. Sod com-

posted with an equal quantity of cow-manure several months in advance of planting is the ideal growing medium. Sheep-manure or bone-meal may be substituted if cattle-manure is not obtainable, adding about ten pounds of the fertilizer to each cubic yard of composted sod. The soil for planting the lily tubers is usually placed in cypress boxes or tubs, two or three feet square by one foot high depending on the type of plant. Planting depth for the tubers is about three inches and it is advisable to cover the soil in the boxes with two inches of gravel or sand to keep the water clear. A flat stone placed over the tuber or root system prevents the plant from floating to the surface. As the tender water-lilies are strong growers, at least eight feet should be allowed between boxes. Hardy varieties are weaker in growth habits and three to six feet between plants will be sufficient. They may be planted any time from April to August. Tender varieties are not to be set out until the permanent temperature of the water is about 70 degrees. From the last week in May until the middle of June is early enough.

Fish are the natural enemies of mosquito larvæ and they are a necessity in all water-gardens. Native fish including bass, sunfish, crappie, and perch are desirable for natural ponds. Goldfish are recommended for pools and basins. A dozen goldfish should be allowed to stock an area equivalent to fifty square feet. Snails, tadpoles, frogs and other desirable aquatic animal life are sold by supply houses to populate water-gardens.

Algæ are very low forms of plant life and their presence in quiet pools may become a nuisance in the form of a green scum on the surface of the water. Fish and intermittent changing of the water aid in keeping them

under control. A small amount of copper sulfate (23 grains to 1,000 gallons of water) is destructive to algæ but not harmful to other plant and animal life. Aphis or plant-lice occasionally attack the leaves and buds of water-lilies. A spray of water from the hose will dislodge them from the plant and they fall an easy prey to the goldfish.

Tender water-lilies require special winter protection. The tubers are removed from the boxes after the first sharp frost and stored in pots of damp sand in a cellar or greenhouse kept at a temperature of 50 to 60 degrees. Some growers report success in storing the entire boxes in a cool cellar or coldframe. If given this protection, complete burying in sand is helpful. Hardy sorts require no protection in large pools where the water is not drained off. In shallow pools draining is necessary and the boxes containing hardy nympheas should then be completely covered with leaves or litter. Filling cement pools with litter or leaves and providing a covering of boards or evergreen branches is a safeguard against cracking.

Selecting plants for aquatic-gardens

Water-lilies deserve the most prominent location in ponds or pools, but their planting must not be overdone. A water-garden with surface completely covered with vegetation is not so interesting as one showing open stretches of water. As a group the nympheas or water-lilies are most interesting. The types in greatest use in modern gardens are species and hybrid varieties gathered from China, India, Europe, Africa, South and North America. The flowers vary in size from two to fifteen inches in diameter and the color range is marvelous.

FIG. 69.—Above, a formal water-garden featuring water-lilies, cat-tails and water hyacinth. Below, a little pool which is primarily a bird bath.

including white, pink, red, blue, purple, and yellow. Fragrance also plays a prominent rôle in establishing popularity. Some species have floating leaves and flowers; others carry them well above the surface of the water. Some species are day-blooming in habit, while others open only in the evening and remain open until late in the forenoon of the following day. It is important to keep this feature in mind when using water-lilies as cut-flowers. In Table IX varieties of both types are given, together with a general collection of plants to be used in connection with water-gardens.

TABLE IX

PLANTS FOR WATER-GARDENS

Nymphœa—water-lily

A. *Hardy types:*

N. odorata—Pond-Lily. White.
N. odorata var. rosea—Cape Cod Pond-Lily. Pink.
N. Marliacea. White.
N. Marliacea var. rosea. Pink.
N. Marliacea var. chromatella. Yellow.
N. tetragona (N. pygmæa). White.
N. tetragona var. helvola. Yellow.
N. Laydekeri var. rosea. Pink.
N. tuberosa. White (large pools and ponds).

B. *Tender day-blooming types:*

N. capensis—Cape Blue Water-Lily.
N. cærulea. Light blue.
N. flavovirens (N. gracilis). White.
N. Mrs. C. W. Ward. Rose-pink.
N. capensis var. zanzibariensis. Deep purple.
N. Mrs. Woodrow Wilson. Light blue.
N. Panama-Pacific. Deep rose-red becoming reddish-purple.

C. *Tender night-blooming types:*

N. Bissettii. Rose-pink.
N. Lotus var. dentata. White.

N. devoniensis. Rose-red.
N. kewensis. Light pink.
N. Frank Trelease. Crimson.

Nelumbium—lotus

N. Nelumbo (N. nucifera, N. speciosum)—Egyptian Lotus. Pink.
var. alba grandiflora. White.
var. rosea plena. Double rose.
var. lutea—American Lotus. Yellow.
var. pygmæa. Pink and white forms.

Miscellaneous plants

Victoria regia—Royal Water-Lily.
Victoria Cruziana (V. Trickeri)—Trickers Royal Water-Lily.
Eichhornia crassipes var. major—Water-Hyacinth.
Hydrocleis nymphoides (Limnocharis Humboldtii)—Water-Poppy.
Myriophyllum proserpinacoides—Parrots-Feather.
Pontederia cordata—Pickerel-Weed.
Typha latifolia—Cat-Tail.
Aponogeton distachyus—Cape Pond-Weed.
Butomus umbellatus—Flowering-Rush.
Calla palustris—Water-Arum.
Cyperus alternifolius—Umbrella Plant.
Cyperus Papyrus—Egyptian Paper-Plant.
Sagittaria latifolia—Arrowhead.
Hibiscus Moscheutos—Marsh-Mallow.
Iris lævigata—Japanese Iris.
Iris Pseudacorus—Yellow Flag.
Iris versicolor—Blue Flag.
Myosotis scorpioides (M. palustris)—Forget-Me-Not.
Lythrum Salicaria var. roseum superbum—Purple Loosestrife.
Lobelia cardinalis—Cardinal-Flower.
Mertensia virginica—Bluebells.
Elodea densa (Anacharis canadensis var. gigantea)—Water-Weed.
Cabomba caroliniana—Green Fanwort.
Acorus Calamus var. variegatus—Variegated Sweet Flag.
Acorus gramineus var. variegatus (dwarf type).

Grasses

Arundo Donax—Giant Reed.
Miscanthus sinensis (Eulalia japonica).
Miscanthus sinensis var. variegatus.

Miscanthus sinensis var. zebrinus.
Miscanthus sinensis var. gracillimus.
Erianthus Ravennæ—Plume-Grass.
Pennisetum villosum (P. longistylum).
Pennisetum Ruppelii (P. Ruppelianum)—Fountain-Grass.
Pennisetum alopecuroides (P. japonicum).
Zizania aquatica—Wild Rice.

CLIMBING FLOWERING PLANTS

Fences, lattice, and trellis construction often constitute an important part of flower-gardens. An unoccupied trellis is not as unsightly as an empty and neglected window-box, nevertheless its primary purpose is to furnish support for vines or climbing plants. Inasmuch as this book deals chiefly with flowering plants, emphasis will be placed entirely on species which are valued and cultivated for their flowers.

Annual flowering vines

For a brilliant display of bloom and quick foliage growth, annual climbers can be depended on to do their part in carrying out the season's plans. They require no pruning, mulching, or winter protection and are excellent for covering buildings where frequent painting is essential or where hardy perennial vines are slow in establishing themselves. They are easily grown from seed in most cases. A few tender perennials are included as they are cultivated as annuals.

Boussingaultia baselloides—Madeira-Vine. Tender perennial vine grown from tuberous roots which must be dug in the fall and stored like cannas or gladioli. In the spring divide tubers and replant. Flowers white and fragrant. Height 10-20 feet.

Calonyction aculeatum—Moonflower. Many catalogues list the moonflower as *Ipomœa Bona-Nox*. Flowers

fragrant, white, about 6 inches in diameter, open in the evening and stay open until direct sunlight strikes them on the following day. East or west side of a building makes the best exposure. Seed must be filed or soaked before planting. Stock grown from cuttings is more certain to flower. Florists often grow such plants for sale.

Cardiospermum Halicacabum—Balloon-Vine, Love-in-a-Puff. The common name balloon-vine is descriptive of the fruits of this climber. The seed-pods are inflated and resemble tiny balloons. Height 5 to 10 feet. Suitable for covering wire fences.

Cobœa scandens—Cup-and-Saucer-Vine. Foliage as well as flowers is desirable. Tendril-climber. For best results should be started under glass. The seeds are flat and scale-like, and germinate better if planted on edge. Height 15-20 feet.

Dolichos Lablab—Hyacinth Bean. A rather stiff but certain grower. Flowers in racemes, reddish-violet. Flowers good for cutting. Twine on strings. Height 10 feet.

Echinocystis lobata—Wild Cucumber. Easily grown. Fine for quick screen and will climb any kind of support. Soak seed before planting. Flowers white. 15-20 feet. Tendril-climber.

Humulus japonicus—Japanese Hop Vine. Flowers resemble bloom of the smoke-bush and have a rather unpleasant odor. Large handsome leaves. 15-20 feet. Tendril-climber.

Ipomœa purpurea—Common Morning-Glory. Too well known to require description. Leaves heart-shaped. Flowers various colors. 6-10 feet. Twiner. Soak seed or notch with a file.

Ipomœa hederacea—Japanese Morning-Glory. Leaves deeply lobed. Flowers larger than preceding species. Same culture.

Ipomœa Leari—Blue Dawn-Flower. Violet-blue flowers about 4 inches across. A fine companion for moonflower, requiring similar culture.

Ipomœa tricolor—Heavenly Blue. Also listed as *I.*

rubro-cærulea. 20 feet. Foliage more delicate than other ipomœas.

Linaria Cymbalaria or properly *Cymbalaria muralis*—Kenilworth-Ivy. Best climber for shady places. Self-sows readily. Fine for ground-cover. Not suitable for trellises.

Maurandia Barclaiana—Maurandia. Flowers resemble snapdragon. Rose, white, blue. A beautiful vine. 5-10 feet.

Momordica Balsamina—Balsam-Apple. Flowers not showy but fruit is very ornamental. Orange- or copper-colored. Surface warty. 15-20 feet.

Phaseolus coccineus (*P. multiflorus*)—Scarlet Runner or Fire Bean. Easy culture. Blooms all summer. Beans are edible when young. 20 feet. Twiner.

Quamoclit pennata (*Ipomœa Quamoclit*)—Cypress-Vine. Beautiful dainty feathery foliage. Flowers orange, scarlet and white. The Cardinal-Climber (*Q. Sloteri*) is a hybrid between the cypress-vine and *Q. coccinea* or Star Ipomœa. Flowers are cardinal in color and very showy. Strings or wire supports best. 10-20 feet.

Thunbergia alata—Black-eyed Susan. For low trellises, window-boxes and hanging baskets. 4-6 feet.

Tropœolum majus—Climbing Nasturtium. Lobb's climbing nasturtium is noted for fine flowers. All are easy to grow. Excellent for window-boxes or hanging baskets. 6-8 feet.

Tropœolum peregrinum—Canary-Bird-Vine. Flowers a decided novelty, clear yellow. 10-20 feet. Same culture as climbing nasturtium.

Hardy perennial flowering vines

Not all hardy vines have showy blossoms. The following species are selected with special reference to flower value:

Adlumia fungosa (*A. cirrhosa*) — Allegheny-Vine. Purplish-pink. 10-15 feet.

Aristolochia durior (*A. macrophylla, A. Sipho*)—Dutchmans Pipe. Greenish-brown. 20 feet.

Campsis radicans (Tecoma, Bignonia)—Trumpet-Creeper. Orange-red. 10 feet.

Clematis paniculata—Japanese Clematis. White. 15-20 feet.

Clematis Jackmani—Jackmans Clematis. Various. 10 feet.

Dioscorea Batatas—Cinnamon-Vine. White. 10-30 feet.

Lathyrus latifolius—Perennial Sweet Pea. Pink-white. 6-8 feet.

Wisteria floribunda—Japanese Wisteria. Lilac. 10-30 feet.

Wisteria sinensis—Chinese Wisteria. Lilac-white. 10-30 feet.

CHAPTER X

STRAWFLOWERS AND EVERLASTINGS FOR WINTER BOUQUETS[1]

In plant language the word "everlasing" refers to various kinds of flowers which have a peculiar make-up, enabling them to hold their form and color indefinitely after drying. The French call these flowers "immortelles," while in America the term "strawflower" is used. Many in garden and flower circles are very fond of everlastings, but others are not so enthusiastic. One hears the expressions "dust-catchers," "painted weeds" and "parlor novelties" applied to these dried specimens.

Everlastings are not necessarily artificial or even painted or dyed. When well grown they possess both beautiful colors and graceful form. Everlastings will never be as universally popular as the rose, the chrysanthemum, or the peony. Nevertheless, they have their place in ornamental horticulture and when they are better understood will be given fair treatment at the hands of the flower-growing and flower-using public. Artificial flowers and highly dyed and dried specimens are popular at the present time. Such extreme fads are unfortunate and to be regretted by real plant-lovers.

To most persons everlasting flowers are limited to use

[1] The material in this chapter is based on an article, "Grow Your Own Winter Bouquets," published in *Better Homes and Gardens,* May, 1926, and reprinted with permission.

FIG. 70.—Above, basket arrangement of strawflowers. Below a bowl of everlastings.

in more or less permanent bouquets arranged in vases, bowls, or baskets for home adornment. This custom dates back many years to the time when immortelles were first grown in France for commercial uses. The sale of these flowers spread the message of their usefulness to all parts of the civilized world. America no longer depends on foreign countries for her supply of strawflowers as she can readily produce all of the desirable forms in her own commercial flower-farms. Most of them can be grown in backyard gardens. This suggests two other uses, namely: strawflowers as garden ornamentals, and for fresh bouquet arrangements during their months of bloom. A study of the different species reveals several with attractive foliage characteristics which, combined with their bright blossoms, qualifies them as first-class border plants. Attractive as the individual blooms are in the dried state, they are far superior when freshly cut. Strawflowers also have possibilities as corsages, small colonial bouquets and other novelties for personal adornment during the winter months.

Most everlastings are easy to grow and, therefore, within the scope of the average home-gardener. However, amateurs often complain of having difficulty in obtaining seeds of strawflowers and reliable cultural directions to accompany the same.

All of the annuals may be sown in the garden after danger of frost has passed, but for early bloom greenhouse or hotbed plants are necessary. Growing the plants is often not as difficult as securing the seed. The perennial everlastings may also be grown from seed, but young plants are easily procured from nurseries and perennial specialists and they are sure to give quicker and better returns. It is never advisable to buy mixed

FIG. 71.—Basket arrangement of strawflowers.

seeds of everlastings as the plants vary so in size and cultural requirements.

Preparing the blooms for winter bouquets is simple. Most of the species should be cut before they are fully open. All foliage should be stripped from the stems and tied in small bunches, suspending them head downward in a dry room. This method will keep the stems straight. However, not all should be dried in this manner. Selecting a few of each species with gracefully arching stems and permitting them to dry over a curved surface will supply enough natural material to guard against stiffness. Permanent arrangements can be made after the flowers are thoroughly dry.

Tall vases or baskets should be filled with dry moss, sand, or any substance that will hold the blooms in the desired position (Figs. 70-71). The exceedingly brittle stems of dried everlastings are often a worry to the beginner. Practice will reduce the number of "broken necks" to the minimum.

ANNUAL EVERLASTINGS

Helichrysum bracteatum—Common Strawflower (Fig. 72). Larger flowers than most other plants used in the dried state. Such colors as white, yellow, pink, red, brown and deep purple may be featured. The plants usually grow about 2 feet high and are attractive in the border.

Helipterum roseum—Rose Everlasting (Fig. 72). Usually sold under the catalogue name of Acroclinium. One of the daintiest in the annual group, being named after the rose-colored blossoms which seem to predominate. A white form is occasionally seen. The plants, which are only 12 inches high, are considered of easy culture.

Helipterum Manglesii—Swan River Everlasting. Cor-

FIG. 72.—Kinds of strawflowers. Above, *Helichrysum bracteatum*, *Helipterum roseum*, *Catananche cærulea*. Below, *Limonium sinuatum*, *L. latifolium*, *L. Suworowi*.

rect culture calls for sowing of the seed in the border where the plants are to bloom as they are impatient of transplanting. They thrive in hot weather and must not be started too early.

Ammobium alatum—Winged Everlasting (Fig. 73). Named after the peculiar winged formation of the flower-stems. Easy to grow and produces a profusion of small white flowers with yellow centers. The cheer-

Fig. 73.—Left, *Gomphrena globosa.* Right, *Ammobium alatum.*

ful blooms are most useful for brightening up somber-hued combinations.

Limonium sinuatum (*Statice sinuata*)—Annual Sea Lavender (Fig. 72). Bears large clusters of flowers on rather long stem. Colors include white, pink, lavender and yellow. The yellow form is *Limonium Bonduelli* and combines beautifully with the blue cornflower or bachelors button in a freshly cut bouquet.

Limonium or *Statice Suworowi*—Russian or Rat-tail Statice (Fig. 72). A most graceful annual bearing rose-pink spikes highly desirable in mixed baskets of cut-flowers. The seed is sometimes difficult to handle in the open ground. Seeding in flats or pans in a hotbed or greenhouse, followed by careful transplanting, will

give the best results. Individual specimens grown in small pots make interesting house-plants during the spring months. Indoor culture, of course, demands early seeding, preferably in January or February.

Gomphrena globosa—Globe-Amaranth (Fig. 73). Bears small globular blossoms of white, pink or red, resembling clover. The globe-amaranth is useful in the garden as a bedding and edging plant. As mice are very fond of the seeds in the dried flower-heads, they must be given protection against rodents during the drying season.

PERENNIAL EVERLASTINGS

Limonium latifolium (*Statice latifolia*)—Perennial Sea Lavender (Fig. 72). Not showy enough to be used alone, but is useful in adding a finishing touch to other flower arrangements.

Catananche cærulea—Cupids Dart (Figs. 72, 74). Deserves more recognition. Its silvery blooms, sur-

FIG. 74.—*Catananche cærulea,* a hardy perennial everlasting.

mounted by a tuft of dark blue, add a note of interest to vase and basket arrangements.

Physalis Alkekengi (*P. Francheti*)—Chinese Lantern-Plant. A perennial which blossoms the first year. The curious lantern-like orange-red blossoms are often wired or tied upon branches of other plants having better foliage.

Lunaria biennis—Honesty, Money-Plant. A biennial producing decorative seed-pods during the second season. Grows well in shady situations. See also page 120.

Gypsophila paniculata—Perennial Babys Breath. The dried flowers of the perennial gypsophila are desirable as strawflowers. The double form is better for this purpose. These plants are propagated by grafting for the most part. See also page 106.

ORNAMENTAL FRUIT AND SEED-PODS

The fruit of some shrubs and vines is interesting in connection with winter bouquets. Bittersweet, barberry, rose "hips" are examples of this.

Dried seed-pods also have their devotees. For vase and basket arrangement one may use cat-tail, globe thistle (eryngium), goldenrod, hydrangea, gimson weed, milkweed, mullein and teazle.

CHAPTER XI

INDOOR FLOWER-GROWING

Plant culture within the confines of the home has been practiced more or less in all civilized countries for hundreds of years. The custom includes both the growing or rather caring for one or several potted plants for purely decorative purposes as well as the collecting of all sorts of house-plants to satisfy the desires of the genuine plant-lover. These two rather distinct classes of home florists exist today, but the rank and file of home-makers are primarily interested in the plants from the decorative point of view. Style in interior decoration has much to do with the type of house-plant culture. Unquestionably flowering plants and foliage specimens lend an atmosphere to any room. Attractive ferneries, hanging-baskets, and plant-containers dictate to a certain extent the type of plants to be grown. When an elaborate plant collection is contemplated, a small greenhouse or conservatory attached to the dwelling is practically indispensable. The pleasures of a small greenhouse are so many that an investment of this kind should be considered as money well spent. Modern greenhouse builders are specializing in home conservatories and employing them for this special service will be economy in the end.

SOILS AND FERTILIZERS FOR HOUSE-PLANTS

Potted plants as received from the florist's greenhouse

have sufficient soil to supply the needs of the plants for considerable time. Ferns, cyclamen, begonias, and primroses are familiar illustrations of the above statement. When plants are to be grown over an extended period or carried along from the infant stage as seedlings or rooted cuttings, special consideration must be given to a new soil supply.

Soil for house-plants differs from garden soil as discussed in Chapter III in that it is largely a made-up composition of various ingredients. Raw garden soil may contain sufficient plant-food to support vegetative growth, but it lacks the proper physical characteristics required for pot-culture. Poor drainage, cracking and hardening are the chief troubles encountered when using soil just as it comes from the garden. All of these difficulties may be corrected by the addition of organic matter in the form of well-rotted manure or leaf-mold and a little sand. A mixture that will be satisfactory for most house-plants should consist of three parts good garden loam, one part well-rotted manure, and one part clean sand. Leaf-mold may be substituted for the manure or a mixture of equal parts of both may be used. The addition of a little bone-meal will provide reserve plant-food in the form of phosphorus and nitrogen. Five or six level tablespoonfuls for each peck of soil is sufficient.

If soil for house-plants is carefully prepared as above described, there is little need for additional fertilizers except for stimulating growth when the plants are in the active stage. Extra fertility when plants are in the normal rest period may be extremely harmful and the same is true for weak and sickly specimens. Starvation measures are far better for such cases.

The short dull days of autumn and early winter are trying for indoor plants. It is well to feed them little in the form of strong fertilizers. At other times when plants are healthy and in active growth or flowering plants showing bud development, light fertilizer applications will increase foliage and stem development and may improve the color of both leaves and flowers. Quick-acting nitrogen fertilizers, as nitrate of soda and ammonium sulfate, are good stimulants but must be used with caution. Two teaspoonfuls dissolved in three gallons of water and applied to the soil can be considered a safe application. The solution may burn the delicate foliage of some plants so should be applied to the soil as a watering. Commercial fertilizers sold under special trade names are usually safe if used as directed. Dried sheep- and poultry-manure are fairly quick in action. A teaspoonful is sufficient for one application, which should be made on top of the soil of the flower-pot and watered in.

PLANT-CONTAINERS

Modern flower-pots of the best grade are machine-made, unglazed and unpainted. The clay is porous, thus permitting evaporation of water from within and entrance of air from without. The wonderful development of young feeding roots along the inner surface of the flower-pot is positive proof of ideal air and moisture conditions for optimum root growth. For this reason all glazed, hard burned or painted pots are ruled out as plant-containers. Other requirements of a good flower-pot include drainage hole in the bottom for prompt removal of excess soil-water, and rounding of the bottom on the inside, permitting easy removal of the plant.

Standard flower-pots measure the same as to height and diameter of the top. They are manufactured in all sizes. For ferns, cyclamen, and other low-growing plants special containers known as fern or azalea pots have the advantage of being only three-quarters as high as the standard pot of equal diameter. The lower con-

FIG. 75.—Potted ferns plunged in moss to control soil-moisture conditions.

tainer is better adapted to the shallow root system and incidentally adds to the grace and symmetry of the potted specimen. Bulbs for forcing may be potted in the fern or azalea pots or regular bulb-pans may be used. Bulb-pans are half as high as standard pots of the same diameter. Pot-saucers are simply earthenware drip pans to catch excess water from the flower-pot. They are a great convenience in the home where many plants are grown.

So-called ferneries are attractive containers, but many of the manufactured types are difficult to manage as no adequate drainage is provided. The problem may be solved in two ways. When two or three ferns or plants are involved they may be "plunged" in moss without removing the plants from the flower-pots. The moss absorbs excess soil-water and at the same time will prevent rapid drying of the soil. Plants may be removed easily for exchange or examination of moisture conditions. (See Fig. 75.) The other alternative involves plants actually growing in soil in the metal liner of the fernery. Any tinner can construct an inner liner of galvanized iron. This second liner should fit snugly inside the first and be raised on metal cleats about one-half inch above the bottom of the outer container. Four to six drainage holes must also be provided. Before filling the box with soil, several pieces of potsherds or broken crockery should be placed over each drainage opening. The excess water is caught in the bottom of the outer metal box and may be removed conveniently

Fig. 76.—Fernery with metal liner and inner liner.

by means of a small brass pet-cock soldered into the bottom. (See Figs. 76, 77.) Changing the soil in a fernery of this type once a year will be sufficient.

FIG. 77.—The inner liner permits excess soil-water to escape through drainage holes.

POTTING (Fig. 78)

The term "potting," as understood by the average home-gardener, is simply the process of removing a plant from one flower-pot and transplanting it into another. In reality potting includes more than that. The planting of rooted cuttings or seedlings in small pots for the first time is quite another phase of the potting operation. So is the planting of larger specimens taken from the garden or coldframe and placed in a flower-pot for indoor growing. The flower-pot should be just large enough to carry the root system without undue crowding. Beginners frequently select large containers for small specimens in the hope that the extra soil will stimulate unusual growth. It has been stated previously that root development is unusually heavy along the inner surface of the flower-pot. Such a condition prevails in both large and small containers. However, it is more difficult for a small plant to get a foothold in the soil of an over-sized flower-pot. There is also the danger of over-watering accompanied by the many ills of a soggy,

heavy and possibly acid soil. From the artistic point of view, a small plant does not look well in a huge flower-pot. There is plenty of time to shift from a small container to a size or two larger when root growth warrants this change.

An understanding of the principles involved in potting may be obtained from a description of the process as it

FIG. 78.—Root system in proper condition for shifting to larger sized pot.

applies to rooting cuttings or seedlings. Small specimens of this type should go into two-and-a-half-inch pots. The first step in potting is the placing of a piece of broken crockery over the drainage hole, covering the same with a little loose soil. The plant is then placed in position with the roots spread out over the soil in the bottom. More soil is added at the same time, holding the plant in the center of the flower-pot. The soil should be firmed around the cutting or seedling with the

fingers and thumbs, simultaneously turning the pot and tapping same on table. Close examination of the finished product shows the following: Soil firmed about the roots; plant in center of flower-pot; container not entirely filled with soil (this space at top permits proper watering). Larger plants are more difficult to handle, but the methods are practically the same. When shifting a specimen to a larger container, the upper layer of old soil should be removed before potting and the roots when matted should be loosened with the fingers. Removal of the old drainage material usually has the desired effect of loosening the lower roots. Specimens whose root systems refuse to come out of the flower-pot with the usual tapping when held in an inverted position may require breaking of the flower-pot for removal. This is better than sacrificing the plant by cutting out the root system with a knife. Re-potting is the correct term applied to the potting operation when the plant is placed in the same sized container or one smaller. This necessitates removal of most of the old soil about the roots. The object of re-potting is to correct root difficulties caused by over-watering, over-feeding, insect attack or unhealthy growth. All freshly potted or re-potted plants should be watered promptly and kept in a cool shady situation for a few days until root action has started.

PROPAGATION OF HOUSE-PLANTS

A simple and easy but not necessarily economical way to renew the stock of house-plants is to patronize the nearest florist. Specimen ferns, azaleas, cyclamen, and palms are examples of plant material involving tedious and long-time methods of propagation. The home-

grower without a greenhouse is seriously handicapped when trying to reproduce new stock and the purchase of "ready-made" plants is the wise procedure. Geraniums, begonias, abutilons, coleus, primroses, and *Asparagus Sprengeri* illustrate types of plants that may be propagated quickly and easily by cuttings or seeds. Cuttings constitute by far the most important method used in the home culture of indoor ornamentals.

Cuttings (Fig. 79)

A cutting, in the horticultural sense, is a detached part of a plant capable of making roots and continuing growth, ultimately developing into a new specimen. Cuttings are made from stems, leaves, and roots. Stem-cuttings are by far the most practical and seem to root

FIG. 79.—Chrysanthemum cuttings in various stages of root formation.

more readily if the upper three or four inches of healthy vegetative tip shoots are selected. The tissue of the stem or wood should be soft, brittle, and not stringy. A sharp knife should always be used for trimming the cuttings. This trimming includes a straight cut at the base of a node or eye, followed by careful removal of the lower leaves and partial cutting back of the upper ones. Shoots with flower-buds are not desirable, but in a few genera, as Impatiens and Begonia, can hardly be avoided. They should be carefully cut or pinched out as their presence would exhaust the vitality of the cutting. The object of trimming off leaves is to reduce the transpiration surfaces. During the preparation of cuttings precautions should be taken against wilting or drying out. Covering with damp newspapers and frequent sprinkling will keep the wood in good condition.

The best medium for the rooting of cuttings is sharp clean coarse sand. Flat boxes or flower-pots are good receptacles for the sand when only a few cuttings are to be prepared. The sand should have perfect drainage, but the cuttings must not become dry enough to wilt. A large flower-pot with a smaller pot in the center for irrigation purposes can be depended on for correct moisture conditions. The drainage hole of the small pot must be corked up before filling with water. Porous clay walls of the inner container will permit sufficient water to reach the propagating sand to keep it moist at all times. Cuttings in the propagating sand are kept from direct sunlight until rooted. A temperature of 65 to 70 degrees is ideal. Dry atmosphere sometimes plays havoc with cuttings, but covering with inverted fruit-jars will correct this trouble. Potting of the slips is recommended after the roots are about one-half inch

long. In the spring, summer and early fall a shaded coldframe may be used for propagation by cuttings.

Growing house-plants from seeds

The successful growing of a plant from seed to maturity is the ambition of all flower enthusiasts. The planting of the seed, the care of the delicate seedlings, the various stages of growth combine to make this fundamental operation extremely fascinating. To be sure it requires both time and patience, but the results are usually gratifying. *Asparagus plumosus, Asparagus Sprengeri,* abutilon, heliotrope, primroses, impatiens, everblooming begonia, Jerusalem-cherry and Christmas pepper are good house-plants that may be propagated at home from seed. Those fortunate enough to own a home greenhouse may adopt the regular florist's method of sowing seeds in flats as early as February and March. More experience is required to negotiate the trials of early planting in an ordinary dwelling, but it can be done. A south window in a room where light, temperature, and humidity may be controlled is a fundamental requirement. If such conditions are impossible it is best to wait until April, starting the seeds in the protection of a coldframe. Artificial heat is not necessary.

For indoor planting of seed one should provide the following equipment: Shallow containers as wooden boxes or earthenware pots; special soil mixture composed of four parts garden soil, one part leaf-mold and one part sand; soil sieve; block for firming soil; labels; watering-pot with fine sprinkler attachment. Flats or boxes should be about two and one-half inches deep on the inside and provided with several drainage holes. The steps in preparing a seed-box or pan are as follows:

1. Place coarse material, as broken pots or moss, over drainage holes.
2. Fill box about one-third full of coarse soil.
3. Add sufficient prepared soil as mentioned above to fill box level full. Screening this soil through one-quarter-inch mesh wire sieve is an advantage.
4. After leveling firm soil evenly with brick or wooden block.
5. Planting seed. If only one kind of seed is to be planted, the broadcasting method is satisfactory. For several kinds of seed divide the box into partitions or plant the seed in rows about one and one-half inches apart. The rows are easily marked off with a pointed stick and may be made any desired depth by pressing down the edge of a straight flat stick. A twelve-inch plant label is excellent for this purpose.
6. Cover the seed with fine soil to an even depth about twice the greatest diameter of the seed. Small seeds are barely covered at all. Seeds planted indoors are not covered as deep as in garden planting.
7. Firm soil gently with firming block.
8. Water carefully with fine sprinkler. If there is danger of washing the seeds out of place, spread a moist piece of coarse cloth of burlap over the soil before adding water. Remove cloth carefully after water has settled.
9. Keep seed boxes shaded until the young sprouts appear.
10. Be sure to label each kind of seed for proper identification.

WINTER CARE OF HOUSE-PLANTS

When killing frosts have halted outdoor garden activities, plant-lovers look to the living-room or conservatory to furnish a home for their growing plants. Some have always had success with house-plants, but many others have given up in despair. Perhaps the chief causes for failure are unnatural growing conditions found in the average living-room and inability to find suitable

material to cope with these conditions. A brief discussion of each problem may be helpful.

Atmosphere

Modern heating systems provide the dwelling with plenty of heat, but the air in the rooms is usually much too dry for healthy plant growth. Dry atmosphere in nine cases out of ten is responsible for plants shedding their leaves and flower-buds failing to open. Tests in greenhouses usually indicate relative humidity of 75 to 85 per cent. In the average living-room during the winter months the tests show a relative humidity of 20 to 30 per cent. Very few plants can survive in such a desert atmosphere. Ingenious plant-growers remedy the situation by remodeling the heating system, vaporizing water over radiators, and syringing the foliage on sunny days. Growing the plants on specially prepared tables or metal-covered trays with moist sand or gravel is a great help. Increasing the humidity not only aids the plants but provides better living conditions for human beings.

Illuminating gas is another insidious enemy of houseplants. Leaks from stoves and lighting fixtures should be corrected promptly as only a very small amount of gas will do a tremendous amount of mischief.

Temperature

Expert florists know that not all plants have the same temperature requirements and they alter conditions accordingly. These adjustments are impossible in dwellings and there the problem can best be solved by providing an average temperature of 65 to 70 degrees in the daytime and about 10 degrees lower at night. The pre-

vailing notion that plants need a constant temperature over a period of twenty-four hours is erroneous.

Cool rooms are better than those kept constantly warm.

Light

Flowering plants need plenty of direct sunlight and a southern exposure is ideal. Foliage plants thrive better in less intense light and east or west windows are recommended. This includes palms and ferns, but they will survive in the subdued light of a north window if other conditions are favorable. Recent experiments with different kinds of glass indicate that present window-glass may be superseded by a new type more suitable for plant growth.

Watering

More plants die each year from over-watering than from any other cause. No hard and fast rules on watering can be laid down as conditions vary so greatly. Soil in pots dries out faster than that in ferneries or plant-boxes on account of the porous condition of the clay. When the surface soil becomes dry watering is usually necessary and enough should be applied to moisten all the soil in the container. Excess water should always be removed as soil soaked all the time will not permit the roots to get their supply of oxygen. Jardinières are handsome but very dangerous if water is allowed to accumulate in the bottom. Extremely dry soil will cause the plants to wilt and if repeated too often may injure or even kill the specimen. Common sense and some knowledge of the plant's natural water requirements are needed for optimum success. Plants of rapid growth

can stand over-watering better than the slow growers. Good drainage for all of them cannot be overdone.

SUMMER CARE OF HOUSE-PLANTS

There may be little difference between summer and winter care of house-plants if home conditions warrant growing them on in the same location. Ferns and palms are moved to the porch as special decorations. Flowering plants are useful in window-boxes. The remainder is better off if given space in the garden or other protected outdoor location. May is a good time for this change and the preliminary step is shifting the plants to larger pots or re-potting into the same sized container, providing fresh soil of course. All straggly growth is pruned off to within two or three inches of the main stem on such plants as begonias, heliotrope, hydrangeas, fuchsias, impatiens, Jerusalem-cherries, abutilons, coleus and lemon verbenas. Azaleas are pruned very lightly, and amaryllis, ferns, palms and other foliage plants not at all. For summer quarters a sunny location should be selected for the flowering kinds, partial shade for foliage plants, and dense shade for ferns. Each pot is sunk to the rim in the garden soil This keeps the soil moist and anchors the plant as well. Ordinary garden care is all that is necessary until early September, when the plants are lifted, the pots washed, and drainage examined. They are then ready once more for their winter quarters indoors.

DISEASES AND INSECTS ON HOUSE-PLANTS

In Chapter IV the principles of controlling garden insects and diseases were fully discussed. These same

principles apply here, but as conditions are slightly different, specific instances will be cited.

Diseases

Surface spots on foliage are usually fungous infestations. A good fungicide for holding leaf-spots in check is liver of sulfur, also called potassium sulfide. The foliage should be sprayed on all sides, using one ounce of this material in three gallons of water. Dusting the plants with powdered sulfur is a safe remedy for mildew. Diseased specimens should always be isolated and in severe cases destroying the entire plant may be the most economical procedure in the end.

Insects

Insects of all kinds seem to thrive on house-plants. It pays to examine thoroughly all parts of the plants at frequent intervals. If any suspicious-looking creatures are found, one should attempt to classify them as outlined below and then apply the proper remedy.

Aphis or plant-lice attack the tips of young shoots, but may also appear on the under side of the foliage. Nicotine (40 per cent) added to soap-suds and applied as a spray is sure death to aphis. The amount as directed on container should be used.

Red-spiders are tiny creatures and difficult to find. Leaves infested with them turn yellowish in spots and a web-like formation is found on the under side. Frequent syringing or washing with water and a high humidity around foliage will prevent the red-spider from gaining control. Some of the newer oil sprays are also effective. Volck is an example of this type of insecticide.

White-fly is most difficult to combat as the creatures fly away when the spray is applied. Nicotine or Volck sprays will give relief. Badly infested plants should be discarded.

Scale insects are serious pests on palms, ferns, rubber plants, and the like. The plants should be washed with heavy soap-suds and the suds left on the stems and leaves for at least an hour before washing off with clear water. Suds made of Fir Tree Oil Soap or Lemon-oil Soap are more effective than ordinary soap. These are commercial plant insecticides. Volck is a safe oil spray for killing scale on house-plants.

Mealy-bugs are white mealy-looking creatures usually forming in cottony masses, and are controlled by same methods recommended for scale insects.

Worms and caterpillars on foliage are chewing insects easily checked by hand-picking or spraying with arsenate of lead, one tablespoonful in a gallon of water.

Angleworms are not serious pests, but if too numerous in the soil lime-water should be applied.

HOTBEDS AND COLDFRAMES

A hotbed offers the home-gardener the most practical method for growing early plants. It has the important advantage over window-boxes of even temperature, moist air, maximum sunshine, and freedom from gases.

There are two general types of manure hotbeds—the pit hotbed, which is constructed in a pit in the ground, and the surface hotbed which is made entirely above ground.

The hotbed should be built in a protected place, such as a south side of a board fence, building, or wall, but well out of the shade of trees or buildings. It should

be near the house, not far from the water supply and on well-drained soil.

The pit hotbed (Fig. 80)

The pit, which should be eighteen to twenty-four inches deep, six to seven feet wide and any length, is preferably dug in the fall before the ground freezes

Fig. 80.—Above, concrete hotbeds. Below, wooden coldframes covered with elevated hotbed sash.

and should then be filled with cornstalks, leaves or straw to keep the walls from freezing too much, a condition which would rob the hotbed of much of its heat in the spring. If not dug in the fall, snow and ice may be scraped from the site and fermenting manure piled over it to thaw out the ground.

The walls of the hotbed may be made of brick, stone, concrete or boards. This may be left in place from year

to year and merely requires filling with manure and soil to proper depths each year and covering with sash.

For the frame one- or one-and-one-half-inch boards are used. Cypress or yellow pine boards are perhaps best, but any heavy durable lumber which is available may be used. The height on the north side or back should be twelve to eighteen inches and on the south side six to twelve inches, thus providing a slope for the sash of six to eight inches.

If the frame of the pit hotbed does not form a part of the wall of the pit, it should be supported by bricks at each corner or a two by four stake nailed at each corner will serve the purpose.

If sash are bought it will be best to get the standard size, six feet by three inches. The single glass sash are perhaps the best as they are cheaper, are easily handled, and more easily repaired. During very cold weather they must be covered with cornstalks, manure, or heavy mats to protect the plants.

Fresh horse-manure containing about one-third or one-half litter or straw should be used for heating material. Manure containing shavings or sawdust is not as good. The manure should be placed in a pile, with straight sides and a flat top, about two weeks before it is used and re-piled when it becomes hot, working the outside of the first pile into the inside of the second. If the manure is dry, heating will be hastened by sprinkling it with warm water as it is put into the hotbed.

The manure should be put in the hotbed about ten days before it is desired to place seeds or plants in it. Each forkful should be shaken out as it is placed in the pit. After each six inches of manure is in position, it should be tramped firmly, paying particular attention to

the corners. The depth of the manure is made a few inches greater than that finally desired because it will settle several inches. After about eighteen inches of manure are in place, four to six inches rich garden soil, finely sifted, placed within the frame and leveled.

The surface hotbed

In constructing a surface hotbed the manure is treated in the same manner, scattered, and tramped as in the case of the pit bed, but is placed on the surface of the ground.

The pile of manure is made about two feet wider and longer than the frame. When the proper amount has been tramped evenly in a pile about eighteen inches deep the frame is placed on the manure and additional manure is banked about the sides. Four to six inches of soil are then placed in the frame and the sash put on.

Within a few days after the hotbed is completed, it should start heating, the temperature usually going above 100 degrees. After five or six days the temperature starts to come down and after it has fallen to 75 or 80 degrees the bed is ready to plant.

Ventilating and watering

The hotbed should be ventilated a little each day, preferably about noon, especially if the sun is shining. This may be done by raising the sash slightly on the side away from the wind. More ventilation can be given until late in spring, when the sash may be removed and left off entirely to harden the plants to outside temperature.

One should water thoroughly when the plants require it, preferably in the morning with a rising temperature

so that the plants will not be chilled and so that the leaves will be dried before night. One should not water on cloudy days and by frequent light sprinklings.

Starting flower seeds in hotbeds

As with certain vegetables, it is a decided advantage to use a hotbed for flower seeds to secure an early start. Many tender and even hardy annual flowers will bloom much sooner if started in seed flats in the hotbed in March or early April. If growth is rapid it may be necessary to transplant the seedlings once before planting in the open garden. As some flower seeds are very small, the soil in the seed flat should be carefully prepared. All coarse material should be screened out and a little sand and leaf-mold added.

Coldframes

A coldframe is similar to a hotbed except that no artificial heat is used. Sunshine is the only source of heat. A coldframe is only practical in late spring as a protection to tender plants. It is used to supplement the hotbed and takes care of surplus specimens before they can be planted in the open garden. It is, therefore, very useful in the hardening off of young flowering plants. Later seedings may also be made in the coldframe.

CHAPTER XII

FLOWERING HOUSE-PLANTS

Plants with flowers are universally preferred to mere foliage specimens. To be sure, they are not as easy to grow as ferns, palms, aspidistra, and the old-fashioned rubber plant. Full sunlight is a requirement for nearly all of them when carried on through the year as a permanent feature of the window-garden. Without greenhouse equipment one cannot be as particular in choosing flowering plants and only a limited number will succeed as living-room decorations. A special effort has been made to select the most desirable and rugged species for this discussion.

AZALEA (Fig. 81)

Family, Ericaceæ; Genus, *Rhododendron;* Species, many, including *indicum, japonicum, molle, obtusum* and hybrids.

For years azaleas were outstanding Easter plants and varieties of Chinese, Indian, and Japanese species became common house visitors. Then the plant embargo cut off the European supply of stock plants and azaleas practically dropped out of the American trade. It has required a number of years of patient work on the part of American propagators and nurserymen to develop a supply of sufficient magnitude to provide plants at a reasonable price.

Fig. 81.—Left, begonia "Melior." Right, azalea.

For house culture it is recommended that the grower start with a fairly large plant in bud or in bloom. Such stock may be procured from a florist in late winter or early spring. During the blooming season and for several months afterwards azaleas should be given a good location in the house. When warm weather arrives the plants are transplanted to the garden. They may also be left in the pots and merely plunged out-of-doors. Scrawny ill-shaped plants are improved by pruning. New stems, foliage- and flower-buds are formed in the summer months. This stored-up energy later results in the gorgeous white, pink, lavender, or red blooms that completely smother the plant itself. In the fall the plants should be stored in a cool light place having a temperature of about 35 to 45 degrees. They are kept here until time for forcing indoors in midwinter or early spring. The same plants will bloom for several years.

BEGONIAS (Figs. 81, 82)

Family, Begoniaceæ; Genus *Begonia;* Species, *semperflorens* — Ever-blooming Begonia; *argentea-guttata* — Silver-spotted Begonia; *albo-picta*—Spotted Begonia; *coccinea* (*B. rubra*)—Scarlet Begonia; *maculata* var. *corallina*—Coral Begonia.

The begonia family is represented by so many species and varieties that it is impossible to do justice to them all. The species listed above are common house-plants. All are fibrous-rooted, free-flowering, and of easy culture. All may be propagated by means of cutting. *B. semperflorens* is often grown from seed. For home culture seed started in early spring in a coldframe will provide blooming plants in late fall and early winter.

FIG. 82.—Left, *Primula obconica*. Right, *Begonia semperflorens*.

Cuttings may be taken at any time. The usual potting soil containing leaf-mold is recommended for begonias.

Rex begonias are primarily foliage plants and are more exacting in their cultural requirements. Florists are featuring several varieties of so-called semi-tuberous-rooted begonias. Melior, Glory of Cincinnati, and Mrs. Peterson begonias are examples of this class. They are beautiful flowering house-plants if kept only while in good condition. They are propagated with difficulty even in a greenhouse so the wise home florist will buy new plants each season.

CALLA

Family, Araceæ; Genus, *Zantedeschia;* Species, *æthiopica*—Common Calla; *Elliotiana*—Golden Calla.

The so-called calla lily is not a lily at all but a member of the jack-in-the-pulpit family. Callas are native to eastern Africa. For house culture as a window plant large rhizomes are preferable to small ones. The rhizomes are potted in early fall, using a rich compost. These plants are heavy feeders and also require an abundance of water at the roots. Growing plants thrive on occasional feeding with liquid manure. In the spring callas are allowed to dry gradually and they remain in this dormant condition until time for re-potting in the fall. Large rhizomes are then divided before re-potting.

CYCLAMEN

Family, Primulaceæ; Genus, *Cyclamen;* Species, *indicum* (*C. persicum*).

No flowering house-plant has ever won as much pop-

ular favor as the graceful cyclamen. From Christmas until Easter it is at its best and a plant in good condition when purchased at the flower shop should be beautiful for at least several months. Failure with cyclamen can usually be traced to neglect or constant exposure in a hot dry room. Plenty of sunlight is another essential requirement. Discriminating plant-lovers who insist on shapely specimens with plentiful bloom should know that such cyclamens are only possible when new plants are purchased each year. Home propagation from seed is too slow and the growing on of last year's specimens too uncertain to merit attention.

CHRYSANTHEMUM

Family, Compositæ; Genus, *Chrysanthemum;* Species, *morifolium* (*C. hortorum*).

The failure of most garden varieties of chrysanthemums to bloom before killing frost has encouraged home-gardeners to try indoor culture at least during the flowering season. This will permit the use of both small and large varieties. Young plants purchased in the spring or propagated from cuttings are potted if they are not grown in containers during the summer. Preparations should be made to give them shelter in case of frost, although ordinary cool weather does not check their growth. In the house they should be grown in as cool a location as possible, giving them plenty of sunlight. For large single-stem specimens, all side shoots and buds except the terminal should be removed. Small varieties of chrysanthemums are more attractive as compact bushy plants and disbudding is not necessary except to thin out the flower-clusters here and there.

FUCHSIA

Family, Onagraceæ; Genus, *Fuchsia;* Species, *hybrida* (*F. speciosa*).

The fuchsia or ladys ear-drops is another old-time favorite that is again coming into fashion. It is an excellent summer-blooming genus useful as a decoration on shaded verandas or screened-in porches. By regulating the season of growth fuchsias may also be selected as winter-flowering house-plants. If young specimens are secured from the florist's greenhouse in late winter or early spring, they will be ideal for indoor bloom the following winter. For summer porch plants young stock should be grown from cuttings in the fall. In either case a resting period after flowering is required by the fuchsia. This is easily accomplished by growing the plants in a cool dry place for several months withholding water except for a small amount required to keep the wood from shriveling. In carrying the plants on from year to year re-potting will be necessary. At that time it is well to cut back all branches to preserve a shapely compact form.

GERANIUM (Fig. 83)

Family, Geraniaceæ; Genus, *Pelargonium;* Species, *hortorum*—Common or Fish Geranium; *domesticum*—Martha Washington Geranium.

The common geranium is considered by many the cheapest and easiest all-the-year plant to grow indoors. It thrives during dull days of December and can be counted on as a sure bloomer in the holidays. Cuttings rooted in March and April and kept growing during the summer either in pots or in the garden will make fine specimens by Christmas. Continuous cultivation in pots,

Fig. 83.—Left, impatiens as a house-plant. Right, geranium.

shifting whenever necessary, is really the most satisfactory method of growing geraniums. As cuttings may be taken any time, it is possible to have plants in all stages of development. A rich potting soil is one secret of success, but careful watering is probably more important. Geraniums should be kept on the dry side, but that does not mean too dry. Propagation by means of slips at least once a year obviates the necessity of enduring "long-legged" and unsightly specimens. The following varieties are always popular: Mme. Buchner, white; Red Barney, red; Alphonse Riccard, scarlet; Beaute Poitevine, salmon; Jean Viaud, pink.

The Martha Washington geraniums are closely related to the common form, but have a different type of foliage and handsomely marked and blotched blossoms. Their season of bloom is not continuous as with the common geranium. Early spring through May and June is the natural time of flowering. For this reason and also on account of their required rest period after blooming some home florists content themselves with buying new plants each year. Plants to be kept over another season should be placed in a sunny situation out-of-doors until September. At that time old shoots should be cut back and re-potted. A coldframe is a good place to keep the freshly potted plants until October, when they are brought into the house. The general requirements of the Martha Washington type of geranium are the same as the common form.

IMPATIENS (Fig. 83)

Family, Balsaminaceæ; Genus, *Impatiens;* Species, *Sultani* and *Holstii.*

Patience and Sultana are popular names applied to

this very useful house-plant. Always in flower, well-shaped, easy to grow, these little plants should be considered as worthy companions of the geranium. Their cultural requirements are very similar. Cuttings of the succulent stems root very easily in sand, but the seed method of propagation is also practical. The plants should be grown in full sunlight for heavy flower and foliage development.

PRIMROSE (Fig. 82)

Family, Primulaceæ; Genus, *Primula;* Species, *obconica*—Common Primrose; *sinensis*—Chinese Primrose; *malacoides*—Fairy Primrose; *Forbesii*—Baby Primrose.

A collection of primroses in full bloom during mid-winter is indeed a cheerful sight. Florists have made a specialty of the *obconica* type on account of its showy bloom and long flowering season, but some object to the poisonous or irritating effect produced by the foliage. This irritation does not affect everyone and is caused by coming in contact with the hairs of the leaves. Washing the hands in a solution of sugar of lead will give immediate relief. Chinese, fairy, and baby primroses are not objectionable in this respect. All primulas are started from seeds sown any time from January to April. The young seedlings are first placed in thumb-pots and later shifted to larger containers as development warrants. Plants of the Chinese varieties must be handled carefully on account of their brittle foliage stems.

FLOWERING MAPLE

Family, Malvaceæ; Genus, *Abutilon;* Species, *hybridum.*

The abutilon is an old favorite on account of the

curious bell-shaped flowers and beautiful foliage which is much like that of the maple tree. Some varieties have a drooping habit and variegated leaves in yellow and green. The ordinary upright kinds differ chiefly in the color of the blossoms, which may be yellow, red, white, or striped. The flowering maple is readily propagated by cuttings or seed. During the summer it is given the usual pot-plant treatment by plunging the pot up to the rim in an outdoor bed. It may also be planted out and potted in early fall. Young plants are likely to become spindling unless the tip shoots are frequently pinched back to induce the formation of side branches.

LILY-OF-THE-NILE

Family, Liliaceæ; Genus, *Agapanthus;* Species, *africanus.*

This beautiful blue-flowered lily is strictly a summer-blooming pot- or tub-plant. It grows best in a rich rather coarse loam. During the winter it is allowed to rest and very little water is necessary during this period. For winter storage a cool light cellar or room where the temperature may be kept between 40 to 50 degrees should be selected. When all danger of frost is past the agapanthus plants are given summer quarters out-of-doors. Plenty of water is the rule for this plant during the growing season. The ordinary species is bright blue. The variety *albidus* is pure white.

JAPANESE ASTILBE

Family, Saxifragaceæ; Genus, *Astilbe;* Species, *japonica.*

Astilbe is the correct name for the beautiful herbaceous plant with the feathery pink or white flower-

FIG. 84.—Cactus blooms are always showy and interesting.

spikes. Although often spoken of as spireas they are in no sense close relatives of that hardy group of shrubs. It is indeed fortunate that astilbes are coming back into popular favor. During recent years they have been almost total strangers in flower shops where once they vied with the lily for supremacy at Easter time. Astilbes have a decided thirst for water and if this peculiarity is understood they will prove excellent house-plants. A saucer or shallow pan of water for each plant is the best way to satisfy this perpetual thirst. After flowering the plant should not be discarded but transplanted to the perennial border. In partial shade astilbes will readily adapt themselves to garden conditions, blooming year after year.

CACTI AND OTHER SUCCULENTS (Figs. 84, 85)

As a group cacti are considered curiosities rather than decorative house-plants, although a few species are exceedingly beautiful when in flower. The Christmas cactus and related types and the night-blooming cereus are illustrations of rare beauty. Cacti are natural desert plants and their water requirements are, therefore, limited. They thrive in the unnatural environment of a flower-pot if given good drainage and a soil composed of equal parts of loam and sand. The addition of a little lime to heavy soils is a wise precaution. Once established the cactus plant may be left undisturbed for several years as far as re-potting is concerned. The pots should be plunged in the garden during the summer, but returned to the house before frost. Water should be given sparingly at all times except during the flowering period. Contrary to the popular idea, cacti prefer a cool

room to one kept constantly warm. Temperature of 50 degrees at night suits them. The Christmas or crab cactus, known botanically as *Zygocactus truncatus,* is the principal form for house culture. Opuntias, Cereus and Echinocactus are also popular types. The cultivation as outlined above for cacti also fits the requirements of other succulent plants suitable for the window-garden, as *Bryophyllum pinnatum* (*B. calycimum*)—so-called "Air-plant"; *Euphorbia splendens* — Crown-of-Thorns; *Mesembrythemum multiradiatum* (*M. roseum*) — Rose Fig-Marigold; Sempervivum in variety — Houseleek or Hen-and-Chickens.

Fig. 85.—The crab or Christmas cactus.

CINERARIA

Family, Compositæ; Genus, *Senecio;* Species, *cruentus.*

For brilliant color in great variety few winter-flowering plants can equal the cineraria. Its one disadvantage is the rather short season of bloom. Unless greenhouse facilities are at hand it is better to purchase plants each year from a reliable florist. In the home liberal soil-moisture and a cool temperature should be provided.

HELIOTROPE

Family, Boraginaceæ; Genus, *Heliotropium;* Species, *peruvianum.*

Everyone is attracted to the heliotrope with its sweet spicy perfume. Pot specimens usually grow twelve to fifteen inches high, but if trained as a standard or tree will grow considerably taller. Stocky plants for winter bloom result only from good summer care. Seed sown in early spring or cuttings rooted at that time will reach blooming size by fall. The young plants should be kept in pots all summer, shifting to larger sizes as required. Pinching back the tip shoots induces freer branching, resulting in stockier plants.

WAX-PLANT

Family, Asclepiadaceæ; Genus, *Hoya;* Species, *carnosa.*

The wax-plant is a tender climber that fills a great need, as indoor flowering vines are rather scarce. The leathery thick leaves have a waxy appearance and the large umbels of flesh-colored flowers are both interesting and decorative. Established plants endure the warm dry air of the average living-room during the winter months. Large specimens in tubs are difficult to move and, therefore, must be kept indoors throughout the year. Plunging the pots in the garden during warm weather is good practice providing the tubs or containers are not too unwieldy.

HYDRANGEA

Family, Saxifragaceæ; Genus, *Hydrangea;* Species, *macrophylla* (*H. opuloides*).

The florist is the best source for potted tender hydrangeas. They are at their best in early spring and

are usually featured for Easter trade. Not all homes are equipped to give this showy plant proper care the year around. For those who wish to attempt it the following suggestions are made: After flowering, cut back all branches about one-half their length; repot and plunge out-of-doors, giving ordinary garden care; in the fall store the plant in a cool light place until January, when it is ready for winter forcing in the window-garden.

OLEANDER

Family, Apocynaceæ; Genus, *Nerium;* Species, *Oleander.*

The oleander is much cultivated as a tub plant for summer display. Its requirements are very similar to agapanthus in that the old plants are kept as dormant as possible during the winter. Water should be given freely while in active growth in warm weather.

PANSY

Family, Violaceæ; Genus, *Viola;* Species, *tricolor* var. *hortensis.*

These fascinating little garden flowers are not impossible subjects for winter cultivation, but their peculiar wants must be understood. A coldframe is a necessary part of the equipment and is used not only for starting the seed in August but also as a storage place for the young plants until they are ready to be taken indoors. Plants in the coldframe are left uncovered until late in October. A liberal mulch of dry leaves supplemented by hotbed sash or boards is all that is required for winter protection. After January and all through the late winter plants may be brought into the house in relays and flowered in a cool light room. The little

English daisy (*Bellis perennis*) will respond to similar treatment.

PETUNIAS

Family, Solanaceæ; Genus, *Petunia;* Species, *hybrida.*

Genuine petunia enthusiasts who are not satisfied with mere garden culture for their favorites may also enjoy them as house-plants. The fringed and double sorts with giant blooms are featured by florists in early spring. Garden-grown stock may also be potted in the fall and brought indoors. The long branches should be cut back before potting.

JERUSALEM-CHERRY

Family, Solanaceæ; Genus, *Solanum;* Species, *Pseudo-Capsicum.*

The Jerusalem-cherry is not strictly a flowering plant, but the showy red fruits serve the same purpose as bloom on other indoor specimens. To have well-berried specimens the seed should be sown in February, the young seedlings potted and plunged out-of-doors after danger of frost is past. They will require several shifts into larger containers, and by the middle of September will be ready for their indoor quarters. As with the cineraria, cyclamen, hydrangea, astilbe, and others the most desirable specimens are always secured from the professional florist. Such stock may be depended on for a long period of usefulness.

CHAPTER XIII

FOLIAGE HOUSE-PLANTS

When killing frosts have halted outdoor garden activities plant-lovers are forced to seek a home for their growing plants in the living-room or sun-parlor. If light, temperature, and atmospheric conditions are just right for ideal growth, the window-garden may boast of a wide range of subjects. Flowering plants and foliage specimens will probably be grown on an equal basis. When conditions are not so favorable, however, the indoor gardener had better consult the list of suitable foliage plants, as they are not as exacting as their flowering relatives.

ARTILLERY PLANT (Fig. 86)

Family, Urticaceæ; Genus, *Pilea;* Species, *microphylla* (*P. muscosa*).

Some place pilea in the category of flowering plants as the branches are covered with minute red blooms during certain stages of growth. The fern-like foliage, however, is the most significant thing about a well-grown specimen and for this reason it should be regarded as primarily a foliage house-plant. The pilea is useful in increasing the atmospheric humidity of the plant-window as the numerous branches and fine leaves transpire considerable moisture. Propagation by cuttings is simple and the only special cultural requirement is that of

heavy watering. After wetting the tops of mature plants placed in a sunny location, the tiny flowers will start a regular bombardment by discharging pollen, hence the popular name "artillery plant."

Fig. 86.—Artillery plant or *Pilea microphylla.*

ASPARAGUS (Fig. 87)

Family, Liliaceæ; Genus, *Asparagus;* Species, *plumosus, Sprengeri.*

The edible asparagus of the kitchen-garden has two ornamental relatives often cultivated as house-plants. *Asparagus plumosus* has such exceedingly fine lace-like foliage that it is often mistaken for a fern. In fact, the common name is asparagus-fern; to speak of this plant as maidenhair fern is of course incorrect. *A. plumosus* and *A. Sprengeri* are not ferns at all but, like other higher plants, produce both flowers and fruit. In growing asparagus in pots it is well to remember that they are heavy feeders and therefore appreciate a rich soil and much water. In early spring top dressings of manure or applications of liquid fertilizer are always feasible. Young plants from seed are superior to specimens propagated by division. January or February are the two best months for sowing the seed. Usually small pot specimens of asparagus may be purchased at the florist shops. *A. Sprengeri* has more uses in the home than its finer-leaved relative, *A. plumosus,* and is rec-

Fig. 87.—Above, Boston fern. Below, *Asparagus Sprengeri.*

ommended as a pot-plant, in hanging-baskets, ferneries, and as an edging or border for other window plants. The foliage of both species is most useful as a decorative green in cut-flower arrangements. *A. plumosus* is grown as a bush pot-plant and also as a vine on trellises.

BEGONIA—FOLIAGE TYPES (Fig. 88)

In the previous chapter some space was devoted to flowering species and varieties of begonia. The foliage type is also well represented. A few outstanding species are:

Begonia Rex—Rex Begonia.
Begonia argenteo-guttata—Silver-spotted Begonia.
Begonia heracleifolia—Star Begonia.
Begonia Feastii—Elepants-Ear Begonia.
Begonia metallica—Metallic-leaved Begonia.
Begonia manicata var. *aurea*—Manicata Begonia.

To grow first-class begonias a soil containing about one-half leaf-mold is necessary. Partial shade also improves the size and condition of the beautiful foliage. Tall specimens are cut back to induce a branching habit. Re-potting old plants about once each year, preferably during spring or summer, is recommended. The favorite way of propagating begonias is by means of slips or stem-cuttings. More adventuresome propagators use leaf-cuttings to secure a maximum number of new plants.

CAST-IRON PLANT

Family, Liliaceæ; Genus, *Aspidistra;* Species, *elatior* (*A. lurida*).

In the aspidistra one finds the happy combination of beauty and ability to resist most adverse conditions.

FIG. 88.—Left, *Pandanus Veitchi*. Right, Rex begonia.

This plant, which is native to China, Japan and the Himalayan mountains, is easily the most robust of house-plants. Dust, dry air, poor light, dry soil, wet soil, gas and other hardships do not hinder its progress. As pot-plants, aspidistras do not grow very tall, but widen out as the new leaves form from the rootstock or rhizome. Both green and variegated forms are in cultivation. Over-feeding causes variegated leaves to turn green. The ordinary form is at home in a rich moist soil. Any established plant may be divided to increase the stock, and February is the ideal time for such division.

COLEUS

Family, Labiatæ; Genus, *Coleus;* Species, *Blumei.*

Everyone knows the familiar "foliage" plant or coleus. Few plants can boast of such a gorgeous array of foliage color. They come from Africa and the East Indies. Growing coleus from seed is most fascinating as the seedlings vary greatly in foliage design. The usual method of increasing or renewing the stock of coleus is to root cuttings in sand. This may be done at any time. Growing plants may be shaped by pinching back long branches. Mealy-bugs are a constant menace to coleus and it pays to control them as soon as discovered.

Varieties of Coleus for house culture are as follows:

Verschaffeltii—Crimson.
Duneria—Various shades of crimson—large leaves.
Golden Bedder—Yellow.
Harding—Chocolate, green and pink.
Trailing Queen—Yellow, green and red—fine for hanging-baskets and ferneries.

CORDYLINE (Fig. 89)

Family, Liliaceæ; Genus, *Cordyline;* Species, *indivisa, australis.*

The old botanical name is *Dracæna indivisa.* Some call it the fountain-plant on account of the graceful and

FIG. 89.—*Cordyline* or *Dracæna indivisa.*

symmetrical arrangement of the long slender leaves. Cordylines are most frequently seen in outdoor window-boxes and vases, where they are featured as accent plants. There is no particular reason why they should not be grown indoors in pots, ferneries, or hanging-baskets. They approach the aspidistras in hardiness and

are equally good in sunshine or shade. In ferneries they combine beautifully with wandering Jew, and this combination is recommended for rooms where atmospheric conditions will not permit the use of ferns or other delicate house-plants. Cordylines are propagated by seed, but young plants in three- or four-inch pots are so inexpensive that it pays to patronize the nearest greenhouse when new stock is required.

CROTON

Family, Euphorbiaceæ; Genus, *Codiæum;* Species, *variegatum* var. *pictum.*

Crotons or variegated laurels are unique in their foliage display of autumn colors. A night temperature of 65 to 70 degrees just suits them, but the one limiting factor in their cultivation at home is dry atmosphere. High humidity is required in the growing quarters or the plants soon drop their leaves. Full sunlight improves the color, but an oversized container or too rich soil offset the beneficial effect of liberal sunshine. Crotons are often bedded out during the summer in locations where a tropical effect is desired.

DRAGON-PLANT

Family, Liliaceæ; Genus, *Dracæna;* Species, *fragrans.*

Dracenas are closely allied to the cordylines. The common name "dragon-plant" refers to the grotesque form of the flower which is rarely seen except on mature conservatory specimens. The variety *Massangeana* is an improvement on the plain green species. The leaves are marked along the midrib with a broad band of yellow. The variety *Lindeni* reverses the color order and

shows the creamy-white band along the outer margins of each leaf. These variegated forms are not as robust as the species. All three forms are available at florist establishments. *D. Sanderiana* is a dwarf, variegated, slender species. Young plants are grown in fern-dishes and used as table decorations.

FERNS

Native ferns are not suitable for house culture and only a few tropical species are sturdy enough to withstand the dry atmosphere of the modern dwelling. Good house ferns are without question more popular than any other indoor decorative plant.

Sword ferns—Nephrolepsis exaltata var. *bostoniensis* (Fig. 87)

The best known variety is the ever popular Boston fern which can always be relied on to give satisfaction not only as pot specimens but also in ferneries and hanging-baskets. The original form has plain fronds and is more easily cultivated than the fancy-leaved varieties. The latter, with their lacy much divided leaflets, are more susceptible to insects and the ravages of dry hot air. Where the improved types may be successfully grown, nothing is more beautiful. The varieties *Whitmanii, Piersoni,* Norwood and *elegantissima* are good examples of the fancy-leaved sword ferns. Bothering with shabby specimens does not pay. Five to six years is the usual span of life and ferns can be kept attractive during this period with just a little extra care. For potting a soil composed of two-thirds fibrous loam and one-third well-rotted cow-manure is ideal. Early fall is the best season to re-pot Boston ferns and at

this time old specimens may be divided for potting in smaller containers. Young plants which have developed from runners in ferneries are also good material for small pots. All house ferns thrive in a location where there is little direct sunlight. More specimens are killed or injured each season by over-watering than by any other cause. It pays to give them perfect drainage and prompt removal of excess water in the bottom of jardinieres is a wise precaution. Many make the mistake of wetting the foliage of Boston ferns while exposed to strong sunlight.

Holly fern—Cyrtomium falcatum (Fig. 90)

The striking resemblance of the glossy dark green leaves to the foliage of holly is responsible for the common name of this fine pot-plant. Holly ferns do not produce runners and, therefore, cannot be divided. At maturity they are about two feet high.

Spider ferns—Pteris in variety (Fig. 91)

All pteris ferns are small in size and are, therefore, well adapted for use in fern-dishes and as fillers in larger containers. The fronds are much divided into long narrow segments often crested or pointed at the ends.

Maidenhair ferns—Adiantum

These are the most delicate and beautiful of all ferns but too fragile for home cultivation except in situations where the surrounding atmosphere can be kept as humid as a greenhouse.

Cultivation of house ferns

The main difference between the cultivation of Boston

FIG. 90.—Above, grevillea or silk-oak, English ivy as a trellis subject. Below, cyrtomium or holly fern, the leopard plant.

ferns and the other species mentioned above is in the soil preparation. For holly, spider and other ferns, except Boston varieties, a mixture of three parts loam, one part sand, one part leaf-mold, and one part well-rotted manure is advocated. Light, moisture, humidity, and temperature conditions are the same for all. It is important to keep the roots cool at all times.

FIG. 91.—The miniature pteris fern.

LEOPARD PLANT (Fig. 90)

Family, Compositæ; Genus, *Ligularia;* Species, *Kæmpferi* var. *aureo-maculata.*

The leopard plant was formerly known as *Farfugium grande.* The resemblance to round-leaved begonias is striking. Each leaf has characteristic yellow spots on a dark green background. When potted in fibrous loam, with good drainage provided, the plants are not difficult to manage.

BOWSTRING-HEMP (Fig. 92)

Family, Liliaceæ; Genus, *Sansevieria;* Species, *zeylanica.*

This plant oddity came from tropical Africa and Ceylon. The leaves are thick but long and pointed and the bizarre markings are responsible for such appella-

FIG. 92.—Left, bowstring-hemp. Right, araucaria or Norfolk-Island-pine.

tions as snake-plant and zebra-plant. Sansevierias do not require much sunlight. When new plants are wanted old specimens may be divided, and re-potted in smaller containers, using a rather heavy soil.

NORFOLK-ISLAND-PINE (Fig. 92)

Family, Pinaceæ; Genus, *Araucaria;* Species, *excelsa.*

The pine family is scarcely represented among plants grown in greenhouses. The Norfolk-Island-Pine or araucaria is a striking exception to this rule. In their native habitat on the Norfolk Islands, araucarias develop into large evergreen trees. Their slow growth permits them to be used as pot-plants in the juvenile state. Not only are they good house-plants, but their symmetrical lines and attractive evergreen foliage make them exceedingly useful as Christmas decorations. It is not practical to propagate araucarias at home. New plants may be secured from commercial florists. In the home they should be given a temperature of 60 degrees at night and protected from the rays of intense sunlight.

PALMS (Fig. 93)

Potted palms are dignified house-plants. They are bold and massive and at the same time graceful. The various tropical countries are the homes of numerous species of palms, but only a few are worthy of consideration for home decorations. As house-plants palms must be attractive and able to withstand dry air, very subdued light, and lack of attention. Many are in the habit of moving large house-plants from one location to another. As long as exposure to very dim light is not extended over a period of more than three or four days, palms do not seem to notice the abnormal conditions.

FIG. 93.—Palms are dignified house-plants.

The best palm species for household use are included in the following list:

Howea Belmoreana—Curly Palm.
Howea Forsteriana—Thatch-leaf Palm.
Rhapis flabelliformis—Rattan Palm.
Syagrus or *Cocos Weddelliana*—Dwarf Coconut Palm.
Phœnix rupicola.
Phœnix Roebelenii—Roebel Palm.
Chrysalidocarpus lutescens—Golden Palm.
Livistona chinensis—Chinese Fan-Palm.

Palms are propagated by means of seeds, but the process is so very slow and exacting that it is not adapted to home culture. It is, therefore, desirable to start with young plants produced in greenhouses. Palms should be kept growing constantly. Over-sized tubs or pots are to be avoided. Re-potting every year or two in heavy soil is all that is required for normal development. The soil mixture may consist of two-thirds fibrous loam and one-third leaf-mold. Firm potting cannot be over-emphasized. Frequent syringing of the foliage is another important item in the care of palms. Covering the soil with heavy paper and laying the plant on its side in bath-tub or out on the lawn in the summer time enables the stream of water to reach all sides of the foliage. The syringing process is helpful in controlling insects. When palms are not re-potted the old soil may be rejuvenated by a top dressing of bone-meal or several applications of liquid manure. During the summer palms may be kept indoors or out in the yard. For outdoor quarters it is well to select a sheltered shady border or bed. The pots or tubs should be plunged to the brim in the soil.

SCREW-PINE (Fig. 88)

Family, Pandanaceæ; Genus, *Pandanus;* Species, *Veitchi, utilis.*

Pandanus Veitchi is the common variegated green and white screw-pine. *P. utilis* is entirely green. Both have long shiny leaves produced in a cork-screw or spiral formation. Old plants have a tendency to become long-legged as if growing on stilts. Removal of the lower roots and re-potting in larger flower-pot will partially correct this defect. *P. Veitchi* produces numerous suckers at the base. These suckers, if cut off and placed in propagating sand and exposed to slight bottom heat, will root as readily as other soft-wood cuttings. Small specimens are desirable center-pieces in fern-dishes.

RUBBER-PLANT

Family, Moraceæ; Genus, *Ficus;* Species, *elastica.*

Tall single-stem rubber-plants are favorites with some, but more prefer branching or bushy specimens. Early pinching is necessary to prevent the shoots from becoming slender and tall. It should be remembered that rubber-plants are gross feeders and much faster growers than palms. Feeding with liquid manure in addition to a rich potting soil is a requisite for normal growth. There may come a time when the favorite rubber-plant is unsightly due to extra-long stem development. Such leggy specimens need a new root system, which may be brought about by so-called Chinese or air-layering. An upward incision is made in the stem at a point near the lowest leaves. The cut is kept open by inserting a pebble or small piece of wood. The next step is to place a split flower-pot around the cut portion and bind same tightly

with copper wire. The pot should be filled with moss or sandy soil and kept moist at all times. Within a period of several months young roots will develop from the cut surfaces. The rooted specimen is then severed from the old stem, potted in another container and given regular care from that time on.

Ficus lyrata or *pandurata* is known as the fiddle-leaved rubber-tree. It has very broad leaves, making a coarse appearance, but is quite hardy.

SILK-OAK (Fig. 90)

Family, Proteaceæ; Genus, *Grevillea;* Species, *robusta.*

Grevilleas are decorative shrubs with fern-like leaves. They may be considered inexpensive substitutes for ferns or small palms. After three or four years they take on a ragged and unkempt appearance and should then be discarded. They are easily grown from seed started in pans or flats in February.

UMBRELLA PLANT

Family, Cyperaceæ; Genus, *Cyperus;* Species, *alternifolius.*

Umbrella plants are fond of water and it is almost impossible to keep the roots too moist. Advantage of this love for water is taken by growers who wish to feature the umbrella plant in connection with an aquarium. Old plants may be divided and the small divisions potted individually. It is also interesting to produce new plants by cutting off a leaf-cluster, leaving about one-quarter inch of stem and placing same in water or sand. As several weeks are required for the rooting process, it is essential to keep the water surrounding the

cuttings fresh by adding bits of charcoal. When rooted the tiny plantlets should be potted in thumb-pots.

VARIEGATED GRASS

Family, Gramineæ; Genus, *Oplismenus;* Species, *compositus.*

This grass is suitable for pots and hanging-baskets, but not for trellises. The foliage is highly colored. Propagation is by cuttings, which may be rooted in small pots in a sandy soil.

VINES FOR INDOOR CULTURE

Every window-garden has a place for a hanging-basket or plant-container with trellis arrangement. The problem is to find suitable vines for filling this special need. The following are suggested as reliable material:

Hedera Helix—English Ivy (Fig. 90). A slow-growing vine preferring a cool situation and heavy soil. Propagated by cuttings.

Senecio milkanioides—German Ivy.—Light green foliage in contrast to the very dark leaves of the English ivy. Also a faster grower. Propagated by cuttings, division.

WANDERING JEW

Family, Commelinaceæ.

There are many forms of this useful and popular trailing plant. *Tradescantia fluminensis* is the ordinary green type. *Zebrina pendula* has purple or bronze-colored leaves with silvery sheen and is most striking. The latter combines beautifully with *Cordyline indivisa* when planted in a fernery. Wandering Jews are so easily propagated that cuttings may be taken at any time. They root readily in sand or water.

CHAPTER XIV

BULBS FOR HOUSE CULTURE

Few flowering plants equal tulips, hyacinths, narcissi, and other so-called bulbous plants for home adornment (Fig. 94). They possess all the advantages of good decorative material and few if any of the disadvantages. Gay colors, fragrance, beauty of form, long season of bloom, and simple cultural requirements are theirs. Bulbs are true harbingers of spring and a welcome addition to all living-rooms.

A bulb at maturity is a living bud or growing point generously supplied by nature with reserve food materials. This explains why it is relatively simple to bring bulbs from their dormant state into full foliage and flower development. The actual growing of the bulb until it reaches flower size is a matter of several years. The home florist is spared all this trouble because expert bulb-growers take this responsibility and produce bulbs better and cheaper than the rank and file of amateur flower fanciers. The bulbs of tulips, hyacinths, narcissus, lilies, and others need only soil, water, sunshine, and proper temperature and an opportunity of growing a good root system to bring them to flowering perfection. For convenience the material discussed in this chapter will be divided into three distinct groups: hardy spring-flowering bulbs; Cape or tender winter- and spring-blooming bulbs; and miscellaneous bulbous plants suitable for indoor forcing.

FIG. 94.—An indoor bulb garden.

HARDY SPRING-FLOWERING BULBS

Only a few years ago all of the plants under this heading were produced on such a large commercial scale in Holland that the popular name "Dutch bulbs" was well deserved. They are still very much in evidence in that country, but dealers of bulbs in America are now supplying the trade with some home-grown stock. Narcissus bulbs are now grown in America, the result of restrictions placed on the importation of certain plants to prevent foreign plant insects and diseases from entering. Obviously prices have gone up, but American growers are gradually increasing their output. A casual study of recent bulb catalogues does not show as much change as might be expected.

Hyacinths (Fig. 95)

There are two distinct types of hyacinths and both are suitable for forcing in pots. The large type is the familiar Dutch hyacinth, which is extremely hardy to frost and most reliable for pot culture. French Roman hyacinths are a tender form imported from France. Each bulb produces several spikes. Their chief characteristics are earliness and tenderness to freezing temperatures. When ordering stock of the large or Dutch hyacinth it is well to remember that first size bulbs produce the best spikes. Some good varieties are:

Gertrude—pink
Gigantea—pink
Grand Maitre—blue
King of the Blues—blue
La Grandesse—white
L'Innocence—white
King of the Yellows—yellow
Yellow Hammer—yellow

Tulips

Early tulips are best for winter forcing. Darwin, Breeder, and Cottage tulips are late-flowering, thus requiring a longer storage period and more exacting care.

FIG. 95.—Dutch hyacinths.

Varieties of early tulips are:

Single-flowering

Kaiserkroon—red and yellow
Vermillion Brilliant—red
Duc Van Thol—scarlet
La Reine—light pink
Proserpine—deep rose
Rose Luisante—pink
Yellow Prince—yellow
Chrysolora—yellow
White Hawk—white
Prince of Austria—orange

Double-flowering

Murillo—pink and white
Couronne d'Or—yellow
Tournessol—red and yellow
Rubra—maxima—scarlet

Narcissus (Fig. 96)

All species and varieties of narcissus are suitable for cultivation in pots. For water culture in bowls of pebbles or bulb fibre only paper-white narcissus and the so-called Chinese sacred lily should be selected. The debarring of narcissus grown in other countries has practically eliminated the Chinese narcissus or sacred lily. These and paper-white bulbs are now produced in the United States.

Narcissus varieties for forcing are as follows:

Long-trumpet or daffodil type

Golden Spur—yellow (single)
Princeps—yellow and white (single)
Emperor—yellow (single)
Empress—yellow and white (single)
King Alfred—yellow (single)
Von Sion—yellow (double)

Medium-trumpet type

Sir Watkin—white and yellow (single)
Mrs. Langtry—white (single)
Orange Phoenix—white (double)

Short-trumpet type

Poeticus ornatus—white
Jonquil—yellow

Other bulbs

Crocus and Muscari or grape hyacinths are also useful spring-flowering bulbs for pot culture. Seven to nine bulbs in a six-inch bulb-pan make an excellent showing.

Fig. 96.—Double narcissus "Von Sion."

Preparing bulbs for forcing

Rich black loam is ideal for the pot culture of all bulbs. The presence of a little sand will do no harm and the addition of leaf-mold will improve the texture, thus preventing a hard-packed growing medium. With the exception of Dutch hyacinths, which look well planted singly in standard four-inch pots, all other kinds are better adapted to bulb-pans or azalea pots (Fig. 97). These shallower containers are more desirable than pots of full height as bulbs rarely grow very tall. The potting operation is not complicated. Good drainage is first provided as in all potting. Enough soil is put in the container to permit placing the bulbs near the top of the pot or pan. After final covering with soil and firming, the tips of the bulbs should be covered with about one-half inch of soil. The pot should never be filled entirely with soil, otherwise watering would be difficult. Pressing the bulbs into the soil is poor practice as the pressure is likely to pack the soil underneath the bulb, making it difficult for the new roots to penetrate the soil. The next step after potting is thorough watering.

Storage of potted bulbs

The object of storing potted bulbs in a cool moist place is to encourage root development before the flower and foliage parts begin to grow. Without an adequate root system it is useless to attempt forcing any of the hardy spring-flowering bulbs. Usually it requires several months of storage before any stock is brought into the living-room or window-garden. With the exception of paper-white narcissus it is unsafe to attempt indoor culture before January. Bulbs brought in from storage in February and March develop much faster than those

brought in during January. The storage item is easily the most important step in bulb culture and to many persons it presents a difficult problem. The ideal temperature for root development is just above freezing, namely 35 to 38 degrees Fahrenheit. If one has access

FIG. 97.—Crocus make good pot subjects.

to a moist cellar or cave where such temperatures may be depended on, the problem is solved very easily. The potted bulbs must be kept dark and the soil moist, never very dry or very wet. As cellar storage with the proper requirements is not always available, the outdoor system of coldframe or pit storage should be employed. A deep coldframe or excavated pit about eighteen inches in depth will answer the purpose. The bulb-pans and flower-pots are placed close together in the pit, and after watering the surface is covered with about one-quarter inch of sand. The object of the sand is to separate the soil in the pots from the overhead covering of soil or ashes. This covering is put on at once to a depth of about four inches. After freezing weather sets in, the frame should be covered with hotbed sash and an extra thick blanket of straw or strawy manure to prevent hard freezing of the soil in the pots. The bulbs are left here until forcing conditions are just right.

Forcing bulbs

The old saying, "do not put all of your eggs in one basket," has a direct application in the growing of bulbs in the home. The blooming season may be extended over several months if only a few pots are brought in at a time. Direct exposure to full sunlight is too sudden a change from the dark storage environment. A simple method of overcoming this difficulty is to cover each pot with an inverted empty flower-pot of the same size. As a result, both foliage- and flower-stems will be longer. It also pays to accustom the plants gradually to higher temperatures. Blooming plants will last longer in a cooler environment where the atmosphere is fairly humid. Forced bulbs of the above mentioned species are of no

value for future indoor culture. If not discarded they may be planted in the outdoor border.

Growing bulbs in water

Planting paper-white narcissus bulbs in bowls of pebbles and water has become an established custom in nearly every American home. Chinese narcissus or sacred lilies, when procurable, lend themselves to the same simple cultural principles. The process is so well known that little need be said concerning it. However, not all persons know that better blooms on larger stems will result if the bowls of bulbs are kept in a cool dark cellar for the first two or three weeks after planting. The cultivation of hyacinths in regulation "hyacinth glasses" is an interesting horticultural experiment, but one must not always expect perfect spikes and foliage. The soil and flower-pot method is far superior.

CAPE BULBS

Cape bulbs receive their name from their native habitat in southern Africa, the Cape of Good Hope. This little known but worth-while group of South African plants includes freesias, ixias, and oxalis. For the sake of convenience a bulbous form of anemone, *Anemone coronaria,* and *Ranunculus asiaticus* may be included here. The two last named genera are not Cape bulbs, but their cultivation is identical. Freesias and oxalis are on the market as early as mid-August and potting may begin then and continue at intervals for several months. This succession planting is only necessary where several sets of blooming plants are desired. Ixia, anemone, and ranunculus are better when not forced until late fall or early winter. The outstanding feature

in caring for this Cape group of bulbs is to supply them with a light, cool, but frost-proof room immediately after potting, 40 to 50 degrees being the proper temperature. Root and top growth is simultaneous, a decided contrast to tulips, hyacinths, and the other Dutch bulbs. After growing in their cool quarters for several weeks or even months, they may be brought into the living-room for final development. All Cape bulbs are small and delicate and consequently do not need large containers. Four- or five-inch pots are large enough. Freesias usually require supports.

MISCELLANEOUS BULBS

This group is quite cosmopolitan and cannot be considered as a unit. Individual discussion for each genus follows.

Amaryllis Hippeastrum (Fig. 98)

For size and striking beauty it is indeed difficult to surpass the amaryllis. The correct botanical name for most of the species in cultivation is Hippeastrum. These plants are often confused with lilies, which they resemble. Unlike other bulbs previously discussed in this chapter, the bulbs may be flowered year after year without danger of weakening them. Amaryllis bulbs are offered for sale by seedsmen and bulb concerns in the late autumn. October and November are good months for securing new stock. The bulbs are usually quite large and require six- or seven-inch pots. Prompt potting on arrival is desirable, using a soil composed of three parts decomposed sod, two parts decomposed manure, and one

part sand. Some of the bulbs will begin to show buds in January. Others may delay the blooming period until late spring. They vary greatly in this respect. An abundance of sunshine and water is essential during the bud formation and blooming period. If flowers form before many leaves are in evidence, this should cause no concern. The major part of the foliage is produced after flowering. The usual care during the summer consists in plunging the pots of amaryllis in an outdoor border. When the leaves show signs of becoming yellow, the regular watering should gradually decrease until the dormant plants are kept on the dry side. The bulbs have matured or ripened in the meantime and the rest period contines until new buds emerge from the bulbs. From then on the plants should be watered regularly to encourage uninterrupted growth. The best time to re-pot amaryllis is just after the flowering period and before new foliage appears,

FIG. 98.—A pot-grown amaryllis.

although no harm is done in re-potting in the fall at the close of the dormant season.

Calla—Zantedeschia æthiopica

Like the amaryllis, the common calla is often wrongly referred to as a lily. In reality it belongs to the Araceæ or jack-in-the-pulpit family. For some growers it behaves well and blooms profusely. Others cannot congratulate themselves on such luck. Failure is now and then traced directly to the use of an impoverished soil. Callas need a very rich growing medium as well as plenty of water while in active growth. Another common mistake is to overlook their rest period. The best way to rest callas is to withhold water gradually and lay the pots over on their sides in a shady dry place. All this takes place during June, July, and August. Early in September the bulbs are removed from the old soil, divided if too large and potted up individually, using a fresh soil mixture. Callas can stand a fairly warm temperature. The common white form is most often seen in cultivation. A highly desirable but smaller variety is known as *Godefreyana.* The golden calla, *Zantedeschia Elliotiana,* has rich green foliage spotted with silver.

Gladiolus

The secret of success with gladioli in the window-garden is to grow them cool. A night temperature of 45 to 50 degrees just suits them. If gladioli are exposed to normal room temperatures, most of them will come blind. If their culture is attempted at all, only very early varieties should be planted late in December or January. They may be started in four-inch pots and

later shifted to six-inch containers. Boxes are also used as containers. Six inches of soil is sufficient to plant the corms about three inches deep. Gladioli corms are started in full light as in the case of the freesia. Storage for root development is not necessary.

Gloxinias

With a little extra care and patience gloxinias may be grown in an ordinary living-room. The large bell-shaped blooms are worth the added effort. The bulbs should be placed singly in four-inch pots, using a rich potting soil containing some leaf-mold and sand. The bulbs are on the market in February and March. They should be grown in a cool room and, when watering the foliage, kept dry. Gloxinias bloom during the summer. Tuberous-rooted begonias are good companions for gloxinias and their culture is similar.

CHAPTER XV

WINDOW-BOXES AND HANGING-BASKETS FOR THE HOME

The arguments for the use of window-boxes and hanging-baskets are too well known to require lengthy comment. To many home owners in crowded cities they afford the only opportunity of growing flowers and plants. To others they are an aid in beautifying the home. All good citizens should realize that the exterior of their home is seen by far greater numbers than the interior, but too often this is overlooked and all efforts are spent in beautifying the inside. An attractive window- or porch-box adds a charm and cheerfulness to any home. If properly planned and planted it may increase the apparent size of any home. It should be remembered at the outset that a shabby poorly planted and neglected window-box is not beautiful and unless it can be done properly it would be wiser not to have one.

WINDOW-BOXES (Figs. 99-101)

To accommodate well grown pot-plants the box should be at least six to nine inches deep, eight to twelve inches wide and any length as required. Where very long boxes are necessary, it is best to construct them in units. Each unit may be from three to six feet long. If much handling of the boxes is necessary, the shorter units will be much more practical.

Constant exposure to moisture and air makes it imperative to use only the most durable materials for

FIG. 99.—Above, window-box plants which will endure shade. Below, window-box for sunny exposure.

the construction of window-boxes. Cypress is the most satisfactory form of wood, but red cedar or white pine are also good. Several coats of good quality outside paint will add both to the beauty and long life of the container. The color is important and should always harmonize with the surroundings. A safe plan is to paint the window-box the same color as the house. If

FIG. 100.—Coleus, begonias and crotons provide rich colors in this foliage combination.

there is some doubt as to the best color, foliage green will generally look well in any situation. Ample drainage should always be provided by boring several holes (about one-half inch in diameter) in the bottom of the box. These should be covered with pieces of broken crockery or stones before filling with soil. For the latter a mixture composed of three parts garden loam, one part leaf-mold, one part sand and one part well-rotted manure will give the best results. If the florist is requested to plant the boxes in addition to supplying the plants, he will undoubtedly use the proper soil mixture.

FIG. 101.—Above, indoor window-box featuring special arch and bird-cage. Below, English ivy as a contrasting note to fernery.

Selection of plants is perhaps the most important point connected with the preparation of a good window-box. As conditions are more favorable to good growth than in the open garden, it is quite feasible to use tender and more valuable plants. Coarse cheap-looking specimens and those that are short-lived should be avoided. A definite color scheme should be planned for. This is just as important for foliage plants as for flowering specimens. For shady positions only such plants as can stand the absence of sunlight should be selected and vice-versa for sunny situations. From two to four kinds of plants in one box are sufficient to secure an artistic effect. The arrangement should be balanced to be attractive. Uniform potted plants of sufficient size to give a finished appearance should be used. One should avoid weak, deformed and straggly specimens. Suggestions on suitable plant material are offered below. Florists, seedsmen and gardeners are usually prepared to supply these in pots.

TABLE X

PLANTS FOR WINDOW-BOXES

Upright plants for sunny exposure

Flowering plants	*Foliage plants*
Ageratum	Achyranthes
Begonia semperflorens	Acalypha
Canna (dwarf varieties)	Aspidistra
Cuphea or cigar-plant	Coleus
Geranium	Cordyline (*Dracæna indivisa*)
Heliotrope	Croton
Lobelia	Dusty miller (three kinds)
Mignonette	Grevillea or silk-oak
Nasturtium	Golden-feather
Nierembergia	Phœnix palm
Petunia	Sweet alyssum (double)

Trailing plants for sunny exposure

English ivy
German or parlor ivy
Ivy geranium
Kenilworth ivy
Maurandia
Mesembryanthemum roseum
Nepeta hederacea or ground ivy
Solanum jasminoides or potato vine
Thunbergia or black-eyed Susan
Trailing fuchsia
Trailing lantana
Trailing lobelia
Vinca major
Wandering Jew

Plants for shaded situations

Aspidistra
Boston ferns
Cordyline
Fancy-leaved caladiums
Feather-leaf—*Asparagus Sprengeri*
Grevillea or silk-oak
Impatiens
Pteris ferns
Rex begonias
Small palms
Tuberous begonias
Pilea or artillery plant.

Plants for outside winter porch-boxes comprise small specimens of the following evergreens: Cedar, spruce, yew, juniper, pine, fir, arbor-vitæ and hemlock.

For trailing effect young plants of *Euonymus radicans* may be used.

TABLE XI

SUGGESTED PLANS FOR WINDOW-BOXES

No. 1 (Sun)

Petunia var. "Rosy Morn."
Plant entire box with above.

No. 2 (Sun)

Dwarf nasturtiums in back.
Lobb's climbing nasturtium in front for trailing effect.

No. 3 (Sun)

Geranium (red)	Geranium (red)	Geranium (red)
Dusty miller	*Asparagus Sprengeri*	Dusty miller
Vinca major		*Vinca major*

No. 4 (Sun)

Geranium (pink)	Petunia (white)	*Cordyline indivisa*	Petunia (white)	Geranium (pink)
Blue ageratum	Dusty miller		Dusty miller	Blue ageratum
Ivy geranium		*Cissus discolor*		Ivy geranium

No. 5 (Shade)

Asparagus Sprengeri	Impatiens	Boston fern	Impatiens	*Asparagus Sprengeri*
Wandering Jew				Wandering Jew

No. 6 (Shade)

Boston fern	*Cordyline indivisa*	Grevillea	*Cordyline indivisa*	Boston fern
Rex begonia		Rex begonia		Rex begonia

Kenilworth ivy (in front).

HANGING-BASKETS (Fig. 102)

The chief purpose of the hanging-basket is to brighten the window or porch. They are welcome additions to sun-parlors and are often fitting companions to indoor window-boxes and ferneries. The old-fashioned wire basket with the sheet-moss lining is still used extensively. A number of pottery companies have developed some beautiful designs in clay hanging-baskets. These have the advantage of greater durability and better water-holding capacity with drip reduced to a minimum. The previously mentioned list of trailing plants is well adapted for use in the planting of artistic hanging-baskets.

MISCELLANEOUS PLANT-CONTAINERS

To relieve the monotony of the conventional flower-pot one can grow single specimens or plant collections in novelty containers. Pottery companies are featuring rustic flower-pots, porch-pots and pedestal jardinières that are most interesting for veranda or sun-room deco-

Fig. 102.—Left, *Asparagus Sprengeri* in hanging-basket. Right, Boston fern.

ration. The old-fashioned urns and lawn vases are no longer in style except in certain formal garden design. Containers of the type mentioned above are planted much the same as hanging-baskets. Good drainage is essential and earthenware saucers are practical additions to fancy porch-pots where jardinières are out of place. Wooden tubs of special design are often used to harmonize with the design of the house. Cypress or red cedar are more durable than other woods and are strongly recommended.

CHAPTER XVI

ARRANGEMENT OF CUT-FLOWERS IN THE HOME

The use of cut-flowers for decorative purposes in the home is very old, but only within recent years has the general public adopted the custom on the present broad scale. There are several reasons for this: In the first place, education along gardening lines is gaining a strong foothold in all parts of the country; secondly, commercial gardeners and florists have kept abreast of the times and are encouraging the ardent amateurs by supplying their every need.

CUT-FLOWERS AND THEIR CARE

Not all flowers in the cut state give perfect satisfaction, and no doubt many persons have been disappointed by the bad behavior of their choice garden or conservatory products. However, the larger number of failures may be traced directly to a misunderstanding of the flower's make-up or a faulty handling of the cut product. Taking this into consideration, the primary object of this discussion will be to advance suggestions, both general and specific, for prolonging the keeping qualities of cut-flowers under average home conditions.

In order to secure a perfect understanding of the problem, a brief study may be made of the physiology or anatomy of a cut-flower. When the cut stem of a

flower is placed in water, the latter is immediately taken up and enters the stem through definite tissues called bundles. The water is conducted upwards through these bundles until it reaches the leaves. Here it passes through the veins until it is distributed to all parts of the leaf. This upward flow of water is a constant process, because of the continuous evaporation of water from the surface of the leaves and flower petals. This evaporation is commonly known as transpiration. Any condition which interferes with this flow of water through the structure of the cut-flower will retard the keeping qualities of the same.

No two flowers will behave in exactly the same way, but the general treatment of all cut blooms involves a number of factors. One of the most important of these is the time of cutting. Flowers should, invariably, be cut in the morning, preferably before ten o'clock, because then they are in the most perfect condition. The petals and foliage are stiff and rigid and the odor, if present, is most perceptible at this time. Exposure to wind and hot sun all day leaves the flowers in a semi-wilted shabby condition, greatly lacking in the sprightliness so desirable in cut specimens.

The question is often asked as to how flowers are best removed from the plant. Scientific experiments show that a sharp knife is the best instrument to use, because it causes less injury to the tissues of the stem than would cutting with a pair of shears or the popular method of breaking off the flowers. Both breaking off and cutting with shears leave the severed end of the flower-stem in a mangled condition, which greatly retards the flow of water previously described. Air bubbles get into the tiny openings of the water-conduct-

ing vessels and clog them. This may be overcome by cutting the end of the stem a second time while holding it under water.

After cutting, the flowers should be placed immediately in a vessel of water and kept in a cool place, as a cellar, for at least several hours. Careless exposure to sun and wind is very detrimental to the keeping qualities. Clean cool water is the best medium in which to place cut-flowers. Hot or boiling water is only used when there is danger of losing the sap, as in the poinsettia and heliotrope, where the end of the stem is seared by placing in boiling water for a moment immediately after cutting, followed by the usual treatment given other flowers.

Vases, bowls, and other containers should be absolutely clean, as grease, acid, or dirt of any kind may prove injurious. There are two classes of cut-flower receptacles, the tall slender individual flower-containers, and the very flat Japanese type of bowl. Both require frequent filling in order to be certain that the end of the stem is in contact with the water.

Cut-flowers keep best in a cool somewhat moist atmosphere. This condition is not present in the average living-room. Coal and illuminating gas fumes in only very small quantities may work havoc with plant life.

In extremely warm weather the water in cut-flower receptacles becomes foul. Molds, bacteria, and other tiny organisms are the cause of the decay of the leaf and stem tissues, which is indicated by the vile odor accompanying the putrefaction process. One way to remedy this trouble is to change the water every day, a practice which should be carried out at any time. The other remedy is stripping the lower leaves off the stems

of such flowers as China asters, calendulas, chrysanthemums. Any congestion of foliage in the vases furnishes an ideal growing condition for the omnipresent molds and bacteria. Clipping the end of the stems while holding them in water is beneficial to a certain extent if repeated every other day or so.

Maturity of the bloom at cutting time is an important consideration, because not all blooms are at their best when fully mature. No definite rule can be laid down, but each flower must be studied individually. Roses, poppies, and peonies are best cut in partial bud state. Flowers of the aster type, also calendula, chrysanthemums, narcissi, tulips, should be allowed to open entirely. Larkspur, snapdragon, gladiolus (Fig. 103) and the like, which bloom in the form of a long spike, give the best results when removed as the lower flowers are opening and the upper ones still in the bud stage. The latter will open gradually, thereby increasing the period of usefulness.

Special methods for keeping flowers

The use of low temperatures (not freezing) is the commercial florists' method of prolonging the life of his highly perishable products; it insures his success. For home use, however, it is only practicable within certain limits. A cool cellar is a convenient place for holding cut-flowers for a period, especially when desired for some distinctive occasion. An ordinary refrigerator is very satisfactory, providing it is large enough and free from strong odors.

Much has been said and written about using salt, sugars, ammonia, and other chemicals for preserving cut-flowers. Scientific experiments have been tried along

FIG. 103.—Above, gladiolus cut as soon as several of lower buds have opened. Below, pink lavatera and light blue delphinnum as table decoration.

this line, but the results were unsatisfactory. Not all flowers respond to the same treatment, and to bother and fuss with a variety of recipes is impractical and not worth while. It is not a question of feeding and nourishing the flowers, but is a problem of retarding development.

Packing and shipping cut blooms

Flowers to be shipped long distances should be cut as explained previously and placed in water for at least two hours before packing—the longer the better. In packing, a strong, rigid, light box and plenty of paper should be employed. The petals of the flowers must be kept absolutely dry. It is not necessary to sprinkle the foliage if proper preliminary treatment has been given.

Flowers for exhibition purposes

To be at their best, exhibition blooms require special attention, both before and after cutting. Delicate colors fade easily, and such flowers should be shaded from direct sunlight. They should be cut before fully open and kept in a cool dark place until time of exhibition.

The extremely perishable nature and the large number of varieties of flowers will always be a barrier to the laying down of definite and absolute rules. However, by combining common sense with a little knowledge of plant physiology days can be added to the life of many cut-flowers and the increased enjoyment is certainly worth the little effort.

CUT-FLOWER ARRANGEMENT (Figs 103-105)

Arranging cut-flowers, ornamental fruits, and foliage in vases, baskets, or bowls is in reality a form of picture-

making. Color and design play a most important part. The appeal of flowers lies in their marvelous colors, graceful form, or attractive fragrance. The latter cannot be improved by careful arrangement, but color and form combinations most certainly can. In nature there is no ugly color, but bad contrasts or poor association may spoil a good color. The so-called spectrum or pink colors are red, yellow, blue, orange, green, and violet. In comparing flower colors with the pure hues of a good

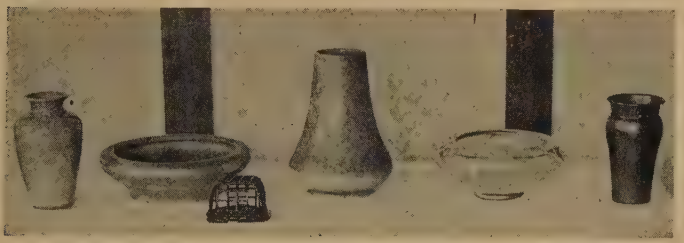

Fig. 104.—Useful bowls and vases for the average home.

color chart, only a few measure up to these vivid standards. Most flower colors are broken; that is, they are either tints or shades of pure colors and are correspondingly lighter or darker than the nearest spectrum hue. This is indeed fortunate as it affords an opportunity of combining flowers without many dangers of startling contrasts. The best guide for safe color combinations is nature herself. One should study the flowers as they grow on the plant and try to imitate this ideal. The use of a single color is simple but most effective, as a vase of red roses, a basket of pink snapdragons, or a low bowl of orange calendulas.

When several colors are involved, the problem becomes more complicated. The following rules may be helpful:

1. Choose cold or retiring colors as blue, violet or blue-violet, purple and lavender for backgrounds.

2. Warm colors as red, yellow, orange are most effective for accents and should not be used in too great a quantity. Red is especially conspicuous and should be employed very sparingly.

3. White and green are harmonizing or peace-making colors. White flowers or green foliage are of great value in bouquets when there is danger of a color clash.

Fig. 105.—An old-fashioned bouquet of mixed garden annuals.

4. Pleasing contrasts by using complementary colors are very striking. Blue iris with yellow buttercup, or yellow iris and blue columbine, are examples of complementary combinations.

5. Delicate tints of pink, yellow, blue, and lavender blend beautifully. Such arrangements are useful under artificial light. In bright daylight use the deeper shades as maroon, deep purple, and bronze.

6. Some really surprising effects may be secured by combining various tints and shades of the same color by using different flowers. For example, if yellow is the chosen color note the charming result of a mixture of calendulas, yellow snapdragon, gaillardia, nasturtiums,

California poppies and small yellow gladioli all carefully arranged in a soft brown basket or yellow bowl.

7. For variety try a riot of many colors. In such an arrangement the only precaution necessary is to use an equal amount of each color and not too much red or orange.

Color in flower pictures is not the whole. The shape or form of the ensemble is very important. Crowding should always be avoided as it destroys each flower's individuality. The use of short-stemmed blooms in tall vases is a common fault; likewise long-stemmed specimens in low bowls. One should not hesitate to cut off some of the stem if it interferes with the beauty of the whole arrangement. Nearly all flowers look best with their own foliage. A bouquet of roses trimmed with fern leaves is stiff and unnatural. The foliage of the rose is so beautiful that ferns or other "greens" merely detract from a natural and perfect picture. If ferns must be used, they should serve as companions to other wild flowers, as goldenrod or native columbine. Feathery foliage, as asparagus and maidenhair fern, is permissible in mixed bouquets or with flowers that do not have much foliage of their own, as sweet peas or carnations. Oak leaves and other autumn foliage add a note of interest to chrysanthemum arrangements, especially when combined with the large shaggy types.

Containers

In selecting flower-containers, those of simple lines and soft color tints should be chosen, as the vase should always be less conspicuous than the flowers. Many creations of pottery, glass, or metal displayed in art shops are in themselves beautiful, but that does

not necessarily mean that they are desirable flower-containers. Vase-makers often overdo it by insisting on hand-painted or other ornate decorations. Subdued colors and plain shapes are the keynote of refinement in vase selection.

As most home-gardens are planned to supply a great variety of cut-flowers, it will be easier to make desirable arrangements if an assortment of vases, bowls, and baskets is at one's disposal. Such a collection need not be elaborate nor expensive. Low bowls with holders or so-called "frogs" are ideal for short-stemmed flowers, and only a small amount of material is required for a complete picture. The latest flower-holders are made of metal resembling mesh or coarse screen wire. They permit arranging of the stems at all angles while the old type of glass holder required all stems to stand erect, causing an unnatural crowding of foliage and awkward position of the flowers. Low baskets having wide metal liners are annoying unless a special contrivance for holding the flower-stems is used. These metal holders will be a convenience in the case of the low bowl. One-inch or one-half-inch mesh poultry netting, cut to fit the basket liner or bowl, is a good substitute for the patented flower-holders.

Table decorations (Figs. 106, 107)

It is appropriate to use flowers in the dining-room at all meals as the primary purpose of the floral arrangement is to add interest and beauty to the table. The flowers should be in keeping with the occasion. For breakfasts or simple luncheons one should choose light-colored flowers and avoid heavy massing. A few blooms artistically arranged are far more effective than a lavish

display. Elaborate bouquets are proper for buffet luncheons, formal teas, and dinners. Not all flowers behave properly under artificial light, and pale yellow, blue, and purple may prove rather disappointing.

Deep pink, red, lavender, and white are always safe

Fig. 106.—Sweet peas and small chrysanthemums—a suggestion for a buffet luncheon.

under any light intensity. Strong yellow and orange may also be included in the list of desirable colors. Another source of embarrassment to the hostess lies in the use of flowers that normally close at night. Day-blooming water-lilies and dimorphotheca or

orange African daisies are the chief offenders in this class.

Bowls and low baskets are the most suitable containers for flowers used as table decorations. Whenever possible the shape of the container should conform to the shape and size of the table. The height of the arrangement is very important and it is advisable not to exceed a maximum height of twelve to fifteen inches or the centerpiece may interfere with the comfort of the guests. If greens, especially smilax, ferns and asparagus, are used to supplement the flower arrangement, they should be placed where they will not be in the way of the guests or the table service. Definite color schemes are always charming. The flowers may harmonize with the candles, ices, cake, candy, nut cups and favors, if any or all of these items are planned for by the hostess. Some novel suggestions for special table decorations may be of value.

Christmas.—Red candle centerpiece surrounded with twigs of holly or evergreens decorated with pine cones, red berries or mistletoe is appropriate. Bowls or low baskets may be arranged with above materials without the candle in center. Two or four tapers or Christmas candles in regulation holders may accompany the bowl or basket. Poinsettias as cut-flowers or low pot-plants are always a holiday feature. Other seasonable flowers for Christmas are red roses and red carnations.

Easter.—Any spring flowers, as narcissus, tulip, hyacinth, roses, mignonette, stocks, are suitable for Easter. They may be used singly or in combination. Pussy-willows are an added attraction to mixed spring bouquets.

Thanksgiving.—The chrysanthemum, which has been

FIG. 107.—A low basket of mixed garden flowers.

rightly called the "Queen of Autumn," is the center of attraction at this season of the year. Chrysanthemums, both large and small, are adapted to table arrangements. Hollowed out pumpkins or squash make novel containers for them. Oak leaves in autumn colors, grapes, and other fruit are fitting companions to chrysanthemums for the Thanksgiving dinner table.

St. Valentines day.—Flowers of all types and colors may be used for St. Valentines day, but red is the most appropriate. Red carnations, tulips, and roses are a few suggestions for this occasion. Heart-shaped containers provide the finishing touch.

Miscellaneous decorations (Figs. 108, 109)

Any event that is worthy of special celebration is worthy of special decoration. Homes are made festive and cheerful by the use of carefully selected cut-flowers or ornamental plants. Their presence spells refinement and they fit any occasion. The civilized world has learned to say it with flowers. In the average American home special decorations are customary for Christmas and other holidays, parties, receptions, home weddings, and other functions of a like nature. The material available for decorative purposes is usually the limiting factor. The chief items to keep in mind in planning a special home decoration are as follows:

1. *Simplicity.*—This is more difficult to bring about in small rooms than in large places. Most designers are tempted to overdo a good thing, and all sense of proportion is overlooked.

2. *Appropriateness.*—When making plans for a decoration it is wise to ask oneself the following questions: Are the materials used in the decoration seasonable?

FIG. 108.—Lythrum and rudbeckia in tall basket.

Will their use actually add interest to the special occasion? Is it possible to carry out the complete plans without interfering with the guests or any part of the program provided for this special event?

3. *Color scheme.*—It is highly important that a definite color scheme be worked out in advance and all flowers and accessories should conform to this plan. Definite color schemes are a distinct aid in putting over special ideas. They also tend to make order out of chaos by synchronizing the various isolated units of the decoration. The same suggestions for color harmony in vase and basket arrangements for cut-flowers apply here.

4. *Finishing touches.*—Many fine flower and plant decorations lose their greatest value on account of lack of attention to details. The complete picture must pass rigid examination from every angle. Poor spacing, color clashes, uncovered flower-pots and absence of a chief point of interest are glaring faults that must be guarded against.

Some suggestions on holiday and other decorations may not be out of place in this connection.

Natural green enlivened with red is the proper color scheme for the holiday season. Commercial interests have capitalized the idea of Christmas decorations to the extent that many persons are tempted to transform their homes into proverbial bazaars by covering every available space with heavy festoons of red and green crepe paper, oversized bells and artificial flowers of assorted shapes and sizes. Such an unnatural effort of adding beauty to the home may be contrasted with the artistic use of nature's Yule decorations: holly or evergreen wreaths trimmed with real berries or pine cones; red candle arrangements with artistic bases of evergreen

FIG. 109.—Christmas decorations. Above, with candle as an accent; center, boxwood balls; below, Christmas wreaths.

twigs; holly and winter berries; boxwood balls tied with the gay Christmas ribbon; potted poinsettias, Christmas cherries and cyclamen; and last but not least the beautiful Christmas tree. It is indeed fortunate that sensible forest conservation measures assure an undiminished supply of evergreens to take care of the holiday demands. Similar precautions should be taken to protect the future of all native ornamentals useful for decorative purposes.

Home weddings (Fig. 110)

Floral decorations for home weddings vary widely in character and much depends on the season of the year. During summer and early fall, garden material may be utilized. Often an attractive garden is used as a setting for a wedding and additional decorations are then rarely required. In the home it is usually customary to provide an improvised altar. Palms, ferns, and other potted plants are effective when massed in the background of the altar. Baskets of flowers and cathedral candles add a touch of formality. Emphasis should be placed on the altar decoration, but other points in the room and adjoining rooms should not be overlooked. Tables, plant stands, tabourettes, and mantles are the proper places for flower arrangements in wedding or reception rooms when guests are standing. Arrangements on the floor would be ineffective and probably in the way of the guests. Since there must be a reason for each phase of a decoration the regular furnishings and color schemes should be given first consideration. If they are elaborate only simple floral and plant additions should be planned. This suggestion also applies to halls, churches, and banquet rooms. The more elaborate decorations are only suitable for places devoid of interior ornament.

FIG. 110.—Left, basket for formal occasions. Right, Shasta daisy and blue speedwell, an informal decoration.

Plant material to supplement cut-flowers in baskets, bowls or vases and the conventional palms and ferns includes wild or southern smilax, greenhouse smilax, asparagus (both garden and greenhouse), wild ferns, Virginia creeper, oak, maple and other autumn foliage, miscellaneous evergreens, holly, and lycopodium or Princess pine.

Originality is a great factor in the art of decorating and constant practice is required for perfection. Each season of the year invites to trial of skill with new and different plant material. It is consoling to know that the flowers in themselves are so perfect that it is difficult to spoil their beauty if nature's principles of arrangement are followed.

CHAPTER XVII

FLOWERS AND THE COMMUNITY

THE community as a whole takes part in amateur gardening through the mediums of garden clubs and flower shows and exhibitions. In this way information is disseminated and interest stimulated.

GARDEN CLUBS

The garden-club movement in America is comparatively recent, but notwithstanding its youth has taken a firm hold on many communities. The idea sprang into being in the older and more settled eastern states, where for years the problem of beautifying homes and the caring for gardens has interested the best citizens in every walk of life. This same enthusiasm has now spread to practically every state in the Union.

The good that comes from an organized club of plant-lovers can be grouped under two main divisions: first, benefits to the community; and, second, benefits to the members themselves. True home-gardeners realize that the exterior of their homes and the surrounding yard are open to the gaze of all. They appreciate the value of a beautiful home and yard. The gospel of beauty spreads from one home to another and finally the entire street is transformed. The direct benefit is obvious, namely, increased value of real estate and a widely advertised community.

Garden clubs are the logical organizations to foster yard and garden contests, amateur flower shows, children's gardens, and tree- and flower-planting campaigns. All the above are educational in nature and assist in the development of better citizenship. Members of any good garden club are benefited by the lectures, demonstrations, flower shows, and visits to other gardens. Regular meetings afford opportunities of exchanging information, plans, and plants.

Essential steps in the organization and maintenance of a garden club

Organization.—Several individuals meet who are thoroughly interested in garden work. It is a help to have the mayor of the town, the editor of the local newspaper, or other influential citizens at this first club meeting. At this meeting a policy should be adopted and general plans of procedure formulated. The organized group announces the first meeting through local papers at least two weeks in advance. It is also essential to invite prospective members by all convenient means, including telephone, post-card and personal conversation, to be present. At the called meeting the purposes and opportunities of a garden club should be ably presented by designated speakers, and after a reasonable opportunity for discussion, organization should be decided on by popular vote. If the vote is favorable, the meeting should then elect officers. The meeting should be so conducted that business is disposed of very promptly as any delay and dragging out will give a poor first impression.

Membership.—Local sentiment should prevail in this meeting. In general, an inclusive membership repre-

senting every type of interest and individual in the community will be most successful.

Officers.—The officers which should be elected annually include president, vice-president, secretary, and treasurer. In some cases it is possible to combine the last two offices named. For detailed suggestions on duties of officers, see suggested constitution.

Committees.—As each community presents a different problem, the types of committees necessary to carry on the year's program will vary in the different organizations. The following committees are important and will be useful in the maintenance of all garden clubs: membership, program, exhibition, and flower show.

Annual dues.—The annual dues of the garden club should be as low as possible and yet consistent with the program as outlined for the year. It is suggested that fifty cents a person will be a good standard to follow in all general cases.

Meetings.—The meetings should be held in a public assembly room such as a community hall or school-house. They should begin promptly at 8:00 o'clock and the main speaker should be allowed one hour. From 9:00 to 9:30 should be used for general discussion on the topic of the evening. From 9:30 to 10:00 should be reserved for business. All meetings should be closed promptly at 10:00 o'clock. The program for the entire year should be printed and presented to all members on January 1st; also published in the garden column of the local newspaper.

Program.—Each meeting of the garden club should present something of interest and practical value to the members. Speakers from neighboring garden clubs, especially when secured on the interchange basis, should

be featured whenever possible. Talks by professional gardeners, college extension workers, and specialists are also suggested. Papers, short talks, or discussion topics by local members of the club should be encouraged as an important phase in the maintenance of the club.

Suggested list of topics for meetings

In order to make this program as elastic as possible, at least three main topics are suggested for each month. Usually one topic for a given meeting will be sufficient, and all preparation should be concentrated on this feature.

JANUARY

If the year's work begins with this month, an effort should be made to have the best speaker available for this first meeting.

Topics

"Our Garden City"—the speaker should develop the fact that a garden club forms one of the outstanding organizations for civic improvement.

"Designing the Home Grounds"—should be presented by a landscape architect, giving the members the benefit of some practical suggestions.

"Trees"—stressing the value of trees, kinds to grow, and best methods of culture.

FEBRUARY

Topics

"Seed and Nursery Catalogues"—discussion accompanied by a display of various catalogues.

"Pruning"—a timely subject when developed to include both ornamental trees and shrubs, as well as fruit subjects.

"Garden Plans"—an explanation of their value and some suggestions on getting a start.

MARCH

Topics

"Fertilizers"—the best kinds to use in garden practice.

"Hotbeds and Coldframes"—how to build them and what to grow in them.

"Perennials for Spring Planting"—lantern slides can be used to great advantage in illustrating this lecture, or photographs or other illustrations may be passed around.

APRIL

Topics

"How to Plant"—talk and demonstration by practical nurseryman or florist.

"Annuals"—the best kinds to grow and their cultural requirements.

"Rock-Gardens and Planting"—this subject may be divided into the two separate phases, "Construction of Rock-Gardens" and "Plants for Rock-Gardens," or both may be combined in one lecture.

MAY

Topics

"Tulips and Spring-Flowering Bulbs"—lecture and demonstration on cultivation. May be combined with tulip show.

"Saving the Wild Flowers"—lecture by botanist or other person interested in the conservation of wild flowers.

"Water-Gardens and Planting"—as in the case of rock-gardens, may be discussed from two angles, viz., "Construction of Pools" and "Plants for Water-Gardens."

JUNE

Topics

"Roses"—the best kinds to grow in a particular location.

"Flowering Shrubs"—their adaptation to use in garden and home grounds. Talk illustrated with specimens of flowering shrubs in season.

"Garden Pests"—spraying, dusting and other methods of fighting garden insects and diseases.

JULY

Topics

"Tree Surgery and Preservation"—how to save valuable specimens. General suggestions on the care of trees.

"Cut-Flower Arrangement"—demonstration on various methods of arranging cut-flowers in the home.

"Garden Inspection Tour"—at least once during the season a meeting should be set aside for garden inspection. Early evening is the best time for this visiting and from four to eight gardens may be included in the itinerary.

AUGUST

Topics

"Gladioli Culture"—better varieties and how to grow them. Illustrate with actual specimens, or visit a good collection.

"Hardy Phlox"—culture of the best species and varieties of this useful hardy perennial.

"Garden Visits"—see discussion under July topics.

SEPTEMBER

Topics

"Fruits in the Garden"—bush- and tree-fruits and their place in the well-planned garden.

"Dahlias"—varieties and culture hints.

"Bulb Planting"—suggestions on kinds of bulbs to buy for fall planting. Methods of planting.

OCTOBER

Topics

"Saving Garden Seeds and Bulbs for Next Year's Garden."

"Winter Protection"—mulching and care of roses, perennials. Storing of tender bulbs and roots.

"Winter Bouquets"—strawflowers and other plant materials suitable for winter bouquets.

NOVEMBER

Topics

"Chrysanthemums"—how to secure good blooms on this popular autumn flower.

"Birds in the Garden"—attracting birds to your garden by means of food, bird-houses and other methods.

"Garden Furniture and Accessories."

DECEMBER

Topics

"Indoor Plants—Care and Management"—the principles of growing house-plants successfully.

"Our Future Work"—talk by the president of the garden club on expanding the various activities of the present year.

"Conservation"—lecture by a member of the Isaac Walton League or other conservationist.

Suggestions for securing garden-club speakers

1. Canvass one's own or neighboring community for good speakers among the following: florists, nurserymen, landscape architects, teachers of botany, private gardeners, flower specialists.
2. Call on extension division of the state agricultural college for talks by specialists.
3. Develop speakers among the ranks of the local membership by having them prepare papers or talks on special topics.

Suggested constitution and by-laws for a garden club

Constitution

ARTICLE I. Name.—This organization shall be known as the ..... Garden Club.

ARTICLE II. Object.—The objects of this organization shall be the encouragement of amateur gardening in .....; the encouragement of shade-tree planting and the improvement of the parkings and lawns of the city;

the exchange of seeds and plants among members; mutual helpfulness in the discussion of gardening methods particularly through a question and answer service, and the exchange of ideas in the meetings.

ARTICLE III. Membership.—Eligibility for membership implies a personal interest in gardening and a pledge to do something for the improvement of home or public grounds in .....

New members must be recommended by the membership committee and elected by a two-thirds vote of the members present at a regular meeting of the club.

ARTICLE IV. Officers.—The officers of the club shall consist of a President, Vice-President, Secretary, and Treasurer.

The President shall preside at all meetings of the club, be responsible for the carrying out of the by-laws of the club, and perform the usual duties of the chief executive officer. He is, ex-officio, a member of all committees.

The Vice-President shall preside in the absence of the President and be chairman of the membership committee.

The Secretary shall preserve a record of the transactions of the club, and present minutes of previous meetings in the general way. The Secretary also has complete charge of publicity, one of the most important factors in garden-club work. It is suggested that the local newspaper be supplied with interesting garden notes, which should appear at regular times. Announcement of coming meetings should always be given in advance in the local newspapers.

The Treasurer should collect the annual dues from each member. He shall also care for other income, and on approval of the President pay the allowed bills of the club.

ARTICLE V. Committees.—The President shall appoint the following standing committees: membership, program, and exhibition.

ARTICLE VI. Changes, additions and amendments.—Changes, additions and amendments to the constitution

and by-laws may be made by a vote of two-thirds of the members at any regular meeting of the club.

Duties of committees: The membership committee shall recommend new members for election and invite eligible candidates to join the club.

The program committee shall perform the usual duties of a program committee.

The exhibition committee shall make all arrangements for the regular or special exhibitions of the club, including the dates, places, premium lists and judging.

By-laws

1. Elections

The officers shall be elected at an annual business meeting which shall be held at a time to be designated.

The President and Vice-President may hold office for more than one term, but they may not hold the same office for two terms in succession.

A nominating committee of three members shall be appointed by the President at least two weeks before the annual meeting which shall nominate at least two candidates each for the offices of President and Vice-President.

Election shall be by ballot.

2. Meetings

The club shall meet monthly, the exact date to be determined by the executive committee. Notices of the meetings shall be sent to all the members seven to ten days in advance of the meeting. Special meetings may be called at the discretion of the President.

3. Exhibitions

Floral exhibitions shall be held not less than three times a year as follows:

(a) Spring flower show, covering especially iris and spring bulbs, but including other seasonable flowers.

(b) Rose show, covering all seasonal flowers as well as roses.
(c) Fall show, covering especially gladioli and dahlias, but including all seasonable flowers.

4. Dues

The annual dues shall be fifty cents a person, payable at time of election.

5. Audit

The President shall appoint an auditing committee to examine the accounts of the club in time to permit the Treasurer to make a financial report at the annual meeting.

FLOWER SHOWS (Figs. 111-113)

At the present time there is a marked tendency to hold more and better flower shows, and the great garden-club movement is unquestionably responsible for this in a large degree. In many communities these exhibitions are annual and not only receive the support of the local garden club, but are often sponsored by various civic organizations as the Chamber of Commerce, women's clubs, and service clubs. There must be a reason why these organizations are willing to give active support to amateur flower shows. It is commonly agreed among those who have the community's welfare at heart that educating the public along the lines of ornamental horticulture is worth while. A flower show not only promotes such education, but actually encourages more persons to have gardens. A public exhibition also raises the standard of the flowers and plants grown. The results are easily seen within the period of a few years and the effect on the community is lasting. Competition of this kind stimulates friendly rivalry and clean sports-

FIG. 111.—Display of flowers staged by amateurs at average county fair.

manship. All citizens are the better for it. In a number of school systems flower shows are welcomed as a vital part of the educational program. Felton, in his book on "British Floral Decoration," discusses children's flower shows and says in part: "Much might be done by local horticultural societies to influence a love of art in the application of wild country flowers or flowers of a cheap and inexpensive character to the beautifying of village homes. There is no doubt that the love of flowers thus inculcated in the children in their early life must have a refining and ennobling effect in their later years. If teachers would interest their little charges in the wild flowers which crowd our country lanes, suggest their gathering some of the favorites, and bringing them to help adorn the schoolrooms, the children would inevitably drop into the habit first of admiring and then making use of these 'wayside weeds' in their homes, and if the local flower-show committee could be interested in the matter much more might be achieved." In the interest of practical conservation it might be appropriate to suggest that the flower-show committee should take the responsibility of interesting children in growing garden flowers for cutting. Wild flowers are decidedly more interesting in their natural surroundings.

Management of flower shows

Amateur flower shows may be held in the spring, summer, or early fall. The usual custom is to feature a variety of displays, but in some communities it may be desirable to specialize on one flower, as the rose, peony, iris, gladiolus, dahlia or tulip. Local conditions are the best guide in determining this factor. The show itself is usually held under the direct auspices of a garden

club, state or county fair, or specialized flower organizations and may be an individual feature or part of other exhibits. Although it is not always feasible to arrange for an exact date it is highly desirable to give prospective exhibitors ample advance notice of the exhibition. Six months is not too much for such notice, and the added publicity is sure to arouse interest in the event.

FIG. 112.—Baskets of wild flowers staged in store window at a rural community flower show.

The actual premium list and detailed information concerning the show should be in the hands of the exhibitor at least three or four weeks before the opening day.

Any organization sponsoring a flower show will do well to delegate full responsibility to a committee of competent members. A satisfactory arrangement divides the work among the committee as follows: Publicity and finance; premiums; entries; decorating. The chairman of the committee is superintendent of the show and

should be given full authority in the management of the same. Dividing responsibility is sure to weaken the organization, paving the way for petty grievances and misunderstanding.

Schedules or premium lists

Exhibitors are entitled to full information concerning rules and regulations of the flower show, kind of material called for in the schedule or premium list and prizes to be awarded in each class. Poorly organized premium lists that are vague and misleading in their statements reflect discredit on those in charge and are annoying to both exhibitors and judges. A good premium list is so clear in its statements that no one is in doubt concerning the meaning which the committee intended to convey.

Rules for any flower show vary according to local conditions. Some useful rules and regulations are as follows:

1. Notices of entries should be sent to the superintendent of the show at least two days before the opening that space may be reserved for all exhibits.
2. Entries must be staged by number. Sealed tags having class and exhibitor's number, together with name and address of the exhibitor, will accompany each exhibit.
3. All exhibits must be in place ready for the judges by 11:00 A.M. the day of the show.
4. After the flowers are staged they will be under the exclusive charge of the show committee.
5. To facilitate judging, exhibits will be arranged by classes so far as may be advisable.
6. Each person who becomes an exhibitor thereby agrees to conform strictly to the rules and regulations.

FIG. 113.—Special arrangement of cut-flower exhibits add beauty to any horticultural exposition.

Exhibitors must not crowd around the judges while they are at work, but must remain at a distance. Violation of this rule will cause disbarment from competition.

7. Any exhibitor not satisfied with the decision of the judges must make his protest in writing and hand same to the superintendent by 7:00 o'clock P.M. on the day on which the award is made.

8. The show committee reserves the right to accept or decline any exhibit, and to exclude any exhibit which in their opinion is undesirable, and to construe, amend or add to any rules and regulations.

Premium lists should be as simple and concise as possible. Exhibits are divided into classes which may be grouped into larger divisions for convenience. All classes in any one premium list should be numbered consecutively.

One of the great problems confronting a show committee is the finding of suitable and attractive premiums. Perhaps it is fortunate that cash prizes are rather difficult to secure, for money is a paltry reward for the achievement of growing and displaying prize-winning flowers and plants. Ribbons and medals mean far more to genuine exhibitors. Special prizes consisting of plants, bulbs, seeds, garden tools, flower-containers, books and periodicals are very sensible and easily procurable from members and local dealers in these supplies who are interested in promoting floriculture. Sweepstake prizes are sometimes awarded for the best vase of flowers or best display on exhibition. Grand prizes are the awards given to the exhibitors winning the highest number of points on the basis of awards made in all classes entered in the show. A definite number of points are allowed for each first premium, each second premium, and so on.

Grand prizes encourage exhibitors to enter in as many classes as possible. In organizing some flower shows it is advisable to provide an entrance fee. However, this should be given most careful consideration as the fee, no matter how small, may discourage many exhibitors. If professional florists or gardeners are allowed to exhibit, special classes should be provided for them. A professional is one who makes a business of growing plants and flowers for sale. An amateur grows flowers solely for pleasure and employs no skilled labor.

To assist members of flower-show committees several suggested schedules are presented in outline form.

SPRING FLOWER SHOW

Division I. Miscellaneous Perennials

All flowers in vases unless otherwise specified.

Class 1. Aquilegia (columbine), 10 stems.
Class 2. Daisies (white), 10 stems.
Class 3. Dianthus (pinks or sweet williams), 10 stems.
Class 4. Coreopsis, 10 stems.
Class 5. Oriental poppies, 5 stems.
Class 6. Pyrethrum (painted daisies), 10 stems.
Class 7. Delphinium (larkspur), 5 stems.
Class 8. Foxglove, 5 spikes.
Class 9. Canterbury bells, 3 stems.

Division II. Peonies

All flowers in vases unless otherwise specified.

Class 10. One specimen bloom double, named, white or cream.
Class 11. One specimen bloom, double, named light pink.
Class 12. One specimen bloom, double, named dark pink.
Class 13. One specimen bloom, double, named red.

Class 14. Best collection single peonies, any color, 10 blooms.
Class 15. Best collection Japanese peonies, any color, 10 blooms.

Division III. Iris

All flowers in vases unless otherwise specified.

Class 16. Specimen stalk, self-colored, white-bearded iris.
Class 17. Specimen stalk, self-colored, yellow-bearded iris.
Class 18. Specimen stalk, self-colored, pink-bearded iris.
Class 19. Specimen stalk, self-colored, lavender-bearded iris.
Class 20. Specimen stalk, self-colored, purple-bearded iris.
Class 21. Specimen stalk, bi-colored bearded iris, any colors.
Class 22. Collection of 15 distinct bearded varieties, 1 stalk each.
Class 23. Collection of 5 distinct beardless varieties, 3 stalks each.

Division IV. Flowering shrubs

Class 24. Lilacs, collection of varieties, 1 stem each.
Class 25. Collection of shrubs, other than lilacs, 3 stems of each in vase.

Division V. Artistic arrangement of irises

Class 26. Artistic arrangement of irises in bowl or basket with or without other flowers or foliage including not more than 10 stalks of iris, suitable for a living-room.
Class 27. Artistic arrangement of peonies (any container) with or without other flowers or foliage suitable for living-room.
Class 28. Most artistic basket of mixed garden flowers.

Class 29. Most artistic bowl of flowers suitable for dining-table.
Class 30. Most artistic vase of flowers.
Class 31. Most artistic arrangement of wild flowers (any container).

FALL FLOWER SHOW

Division I. Miscellaneous annuals

All flowers in vases.

Class 1. Cosmos, best bouquet white.
Class 2. Cosmos, best bouquet pink.
Class 3. Cosmos, best bouquet red.
Class 4. Coxcomb, vase of 4 stalks red.
Class 5. Coxcomb, vase of 4 stalks yellow.
Class 6. Snapdragon, white, 12 spikes.
Class 7. Snapdragon, pink, 12 spikes.
Class 8. Snapdragon, yellow, 12 spikes.
Class 9. Snapdragon, red, 12 spikes.
Class 10. African marigold, orange, 12 blooms.
Class 11. African marigold, yellow, 12 blooms.
Class 12. Calendula (pot marigold), 12 blooms.
Class 13. Zinnias, yellow, 12 blooms.
Class 14. Zinnias, red, 12 blooms.
Class 15. Zinnias, pink, 12 blooms.
Class 16. Zinnias, bronze, 12 blooms.

Division II. China aster

Class 17. White, 12 blooms, double.
Class 18. Light pink, 12 blooms, double.
Class 19. Dark pink, 12 blooms, double.
Class 20. Lavender, 12 blooms, double.
Class 21. Purple, 12 blooms, double.
Class 22. Single, all colors, best bouquet, 12 blooms.
Class 23. Anemone type, all colors, best bouquet, 12 blooms.

Division III. Gladiolus

Class 24. White, 3 spikes one variety, named.
Class 25. Light pink, 3 spikes, one variety, named.
Class 26. Dark pink, 3 spikes, one variety, named.
Class 27. Yellow, 3 spikes, one variety, named.
Class 28. Orange or bronze, 3 spikes, one variety, named.
Class 29. Cream, 3 spikes, one variety, named.
Class 30. Crimson, 3 spikes, one variety, named.
Class 31. Scarlet, 3 spikes, one variety, named.
Class 32. Purple, 1 spike, named.
Class 33. Blue, 1 spike, named.
Class 34. Largest and best collection of named gladioli, 1 spike of each variety.
Class 35. Largest and best collection of primulinus varieties.

Division IV. Dahlias

Class 36. Decorative dahlia, white, 1 bloom.
Class 37. Decorative dahlia, yellow, 1 bloom.
Class 38. Decorative dahlia, pink, 1 bloom.
Class 39. Decorative dahlia, red, 1 bloom.
Class 40. Cactus or hybrid cactus, white, 1 bloom.
Class 41. Cactus or hybrid cactus, yellow, 1 bloom.
Class 42. Cactus or hybrid cactus, pink, 1 bloom.
Class 43. Cactus or hybrid cactus, red, 1 bloom.
Class 44. Peony-flowered dahlia, white, 1 bloom.
Class 45. Peony-flowered dahlia, yellow, 1 bloom.
Class 46. Peony-flowered dahlia, pink, 1 bloom.
Class 47. Peony-flowered dahlia, lavender, 1 bloom.
Class 48. Peony-flowered dahlia, red, 1 bloom.
Class 49. Show dahlias, best collection, 6 blooms.
Class 50. Pompon dahlias, best collection, 6 blooms.

Division V. Artistic arrangements

Class 51. Bowl, garden flowers, any kinds.
Class 52. Vase, garden flowers, any kinds.
Class 53. Basket, garden flowers, any kinds.

Class 54. Basket, wild flowers only.
Class 55. Strawflowers, green or dried, basket or vase.

Division VI. Miscellaneous

Class 56. Best collection of house-plants in pots.
Class 57. Best collection of hardy perennials, cut-flowers in vases.
Class 58. Garden roses. Best collection in vase.

ROSE SHOW

Division I. Hybrid Tea roses

Three blooms in vase.

Class 1. Light pink.
Class 2. Dark pink.
Class 3. Red.
Class 4. White.
Class 5. Yellow.

Division II. Hybrid Perpetual roses

Three blooms in vase.

Class 6. Light pink.
Class 7. Dark pink.
Class 8. White.
Class 9. Red.

Division III. Miscellaneous roses

Class 10. Climbing rose, 1 spray any variety.
Class 11. Polyantha or Baby Rambler, 3 sprays any one variety.
Class 12. Rugosa, 3 sprays.
Class 13. Any other bush variety, 3 sprays.

Division IV. Collections

Class 14. Hybrid Teas, largest and best collection. 1 bloom of each variety.

Class 15. Hybrid Perpetual, largest and best collection, 1 bloom of each variety.

DIVISION V. ARTISTIC ARRANGEMENT

With or without additional foliage

Class 16. Most artistic vase of roses.
Class 17. Most artistic bowl of roses.
Class 18. Most artistic basket of roses.
Class 19. Arrangement of roses and other flower, any container.

These schedules are merely suggestive and may be altered to suit local conditions. Special schedules for gladiolus, dahlia, tulip, peony, and iris when one of these flowers is featured alone may be modeled after the rose premium list given above.

Staging the show

All flower exhibits should be staged in attractive centrally located buildings easily accessible to both exhibitors and visitors. Public buildings, as schools, town halls, and libraries, are suitable. Large salesrooms, stores, and hotels are often used to good advantage. A small town without an available display room solved the problem by staging and displaying the separate classes in various store windows. Additional prizes were awarded to the merchants displaying the flowers to the best advantage. The result was added interest in the community and considerably more persons to see the exhibits.

A good flower-show room should be large enough to accommodate all exhibits and visitors without crowding. A source of water for vases is a great convenience. Decorations supplementing the exhibits are always worth

while. Containers for competing exhibits may or may not be furnished by the management. In any event an effort should be made to have all vases as uniform as possible except in the classes of artistic arrangement. Milk bottles are useful for most cut-flowers. Fruit-jars are also a possibility for short-stemmed material. Glass containers other than regulation vases are far more effective if covered with water-proof green paper. This is easily applied and held in place by tieing with green twine or thread. For large bouquets ice-cream cans are suggested. They are far less conspicuous if covered with green paper as suggested for bottles and fruit-jars.

Judging

A definite time should be set for judging the exhibits and strictly adhered to. For small shows one competent judge will be sufficient. A committee of three judges may be more desirable for elaborate exhibitions where many collections are involved. Judges are not to be interfered with by exhibitors while at work. All entries are known to the judges by number only. It is the duty of the superintendent to have all classes arranged in groups in order to expedite matters for the judges. An assistant should be selected to accompany the judge or judging committee for the purpose of recording all awards as soon as decisions are made. The entries are recorded by number only in the judge's book and by name and number in the general entry book. Judges are not given access to the general entry book until after all awards have been made. When competition is keen the judges are usually instructed to follow rather definite judging scales as laid down by the societies promoting these particular flowers.

JUDGING SCALES

Chrysanthemums.—The scale of points used by the Chrysanthemum Society of America is:

Single varieties: Color, 40; form, 20; substance, 20; stem and foliage, 20; total, 100. Single varieties should be divided into two classes, the large-flowered and the small-flowered.

Pompon varieties: Color, 40; form, 20; stem and foliage, 20; fullness, 20; total, 100.

Dahlias.—The scale of points for dahlias, as supplied by the American Dahlia Society, is:

Cactus: Flowers fully double; petals long, narrow, incurved, or twisted, evenly set; center moderately developed, but without a green tinge; the back petals not faded; color and freshness, 3; form and refinement, 3; good center, 1; stem, 2; size, 1.

Show type: Flowers double, of good size, globular or ball-shaped rather than broad or flat, center of bloom well up and even; color bright and fresh, the back petals not faded; color and freshness, 3; form, 3; good center, 2; size, 1; stem, 1.

Decorative: Flowers double, flat rather than ball-shaped, with broad, flat, somewhat loosely arranged floral rays with broad points or rounded tips which are straight or decurved (turned down or back), revolute if rolled at all; flowers of good size and back petals not faded; color and freshness, 3; form, 3; size, 2; stem, 2.

Peony-flowered: Flowers with open center, the inner floral rays curled or twisted, the outer petals flat or more or less irregular; the back petals not faded; color and freshness, 3; form, 3; size, 2; stem, 2.

Pompon: Flowers relatively small (under 2 inches), yet very dense of petal, rounded, and having good centers; they should be a miniature form of show dahlias; color and freshness, 3; form, 3; good center, 2; stem, 2.

Single, duplex, collarette, and anemone-flowered: Should be shown in bunches and effectively displayed; arrangement, 3; color and freshness, 3; arrangement, 2; freshness, 2.

Gladiolus.—The scale of points of the American Gladiolus Society is as follows: Resistance to disease, 5; texture of flowers, 10; duration of bloom, 10; size of bloom, 10; color of bloom, 15; form of flower, 10; form of spike, 10; stem (length and stiffness), 10; number of flowers on spike, 15; vigor (aside from disease resistance), 5; total, 100.

Peonies.—Size and fullness of bloom, 2 points; regularity of guard-petals, 1 point; compactness and symmetry, 1 point; clearness of color and freshness, 1 point; average evenness of blooms, 1 point.

Roses.—The scale of points of the American Rose Society for competitive classes is as follows: Flowers: Size, 15; color, 20; stem, 20; form, 15; substance, 15; foliage, 15; total, 100.

Specimen rose plants: Size, 20; cultural perfection, 25; floriferousness, 20; foliage, 15; quality of bloom, 10; color of bloom, 10; total, 100.

Groups of rose plants: Size of group or collection, 20; distinctiveness, 15; cultural perfection, 20; number of varieties, 20; arrangement and effect, 25; total, 100.

For novelties to be awarded certificates: Size, 10; color, 20; stem, 15; form, 15; substance, 10; foliage, 15; fragrance, 5; distinctiveness, 10; total, 100.

Sweet peas.—The scale of points provided by the American Sweet Pea Society is as follows:

Length of stem, 25; color, 20; size, 25; substance, 15; number of flowers on stem, 15; total, 100.

Floral arrangements.—Bowls, vases or baskets. Harmony of color, 40; arrangement, 40; quality of bloom, 10; harmony of flowers and container, 10.

Flowering and foliage plants.—

Collection of Flowering Plants		*Collection of Foliage Plants*	
Size of collection	15	Size of collection	15
Cultural perfection	30	Cultural perfection	35
Number of varieties	20	Number of varieties	15
Arrangement or staging	35	Arrangement or staging	35
Total	100	Total	100

INDEX

Abronia, 66, 177
Abutilon, 231
Acalypha, 276
Achillea Ageratum, 170
Millefolium, 108
Ptarmica, 108
tomentosa, 170
Achyranthes, 276
Acid-phosphate, 26
Aconitum, 112
Acorus Calamus, 187
gramineus, 187
Acroclinium, 68
Adams Needle, 108
Adiantum, 248
Adlumia, 190
Adonis, 97, 170
Ægopodium, 170
Agapanthus, 232
Ageratum, 58, 68, 177, 276
Ajuga, 170
Algæ, control of in pools, 184
Alkanet, 102, 120
Althæa, 54, 120
Alyssum maritimum, 54, 177
rostratum, 170
saxatile, 97, 170
Sweet, 170, 177
Amaranthus caudatus, 66, 69
cruentus, 66, 69
salicifolius, 66
tricolor, 66
Amaryllis, 268
Ammobium, 68, 198
Ammoniacal copper carbonate, 97
Ammonium sulfate, 26
Amsonia, 102
Anacharis, *see* Elodea
Anagallis, 66, 177
Anchusa, Annual, 66, 69
azurea, 102, 120
capensis, 66, 69
italica, see A. azurea
myosotidiflora, 170
Anemone, 178
canadensis, 170
coronaria, 267
japonica, 113
Pulsatilla, 170
sylvestris, 170
Wood, 170
Angels-Trumpet, 66
Annuals, 39-69
advantages of, 39, 40
blue border, 68
definition of, 39
culture of, 41
hardy, 54-58
pink border, 68
red border, 69
rock-gardens, 177
seed buying, hints on, 40
sowing seeds of, 41, 42
special uses for, 40
tender, 58-64
white border, 68
yellow border, 68
Anthemis, 102
Antirrhinum, 49
Aphis, on water-lilies, 184
Aponogeton, 187
Aquatic-gardens, *see* Water-Gardens

Aquilegia, American species of, 74
culture of, 75
introduced species of, 75
propagation of, 75
species of, 74, 75, 170
Arabis, 98, 170
Araucaria, 252
Arctotis, 60, 68
Arenaria, 170
Argemone grandiflora, 66, 68
mexicana, 66, 69
Aristolochia, 191
Arsenate of lead, 35
Artemisia Abrotanum, 113
lactiflora, see *A. vulgaris*
Stelleriana, 113, 170
vulgaris, 113
Artillery plant, 239, 277
Arundo, 187
Asclepias, 108
Asparagus fern, see *A. plumosus*
plumosus, 240
Sprengeri, 240, 277
Asperula, 66, 68
Aspidistra, 242, 276, 277
Aster, China, 42, 68
botanical classification, 42
culture, 42
diseases, 43, 44
history of, 42
insects, 43
varieties, 44
Aster, culture of hardy, 78
hardy, 76, 170, 171
propagation of hardy, 78
species of hardy, 77
Stokes, 175
varieties of hardy, 77
Astilbe japonica, 102, 232
Aubrietia deltoidea, 98
Avens, 104, 172
Azalea, 222

Baby-Blue-Eyes, 177
Babys-Breath, Annual, 56
Perennial, 106, 200
Bachelor Button, see *Centaurea Cyanus*
Backgrounds, garden flower, 10
hedge, 10
shrub, 10
lattice-fence, 10
Balloon-Flower, 112
Balloon-Vine, 189
Balsam, 68, 69
Alpine Liver, 171
garden, 61, 68, 69
Balsam-Apple, 190
Baptisia, 104
Barberry, 200
Bartonia, *see* Mentzelia
Baskets, cut-flower, 290
Bean, Fire, 190
Hyacinth, 189
Beds, *see* Flower-beds
Bee Balm, Oswego, 111
Begonia, 224, 242, 271, 276, 277
culture of, 224
flowering, 224
foliage, 242
tuberous-rooted, 271, 277
Bellflower, Carpathian, 171
Chimney, 120
Peach-leaf, 104
Bellis perennis, 98, 171
Bellwort, 178
Belvedere, 56
Biennials, 118, 120
culture of, 118
definition of, 118
Bittersweet, 200
Black-eyed Susan, 190
Blazing Star, 67, 111
Bleeding-Heart, Common, 98
Plumy, 98
Blister-Cress, Rockery, 171
Blood, dried, 26
Bloodroot, 174
Bluebells, 100, 173, 187
Blue Laceflower, 67
Bluet, 178
Bocconia, 108
Boltonia asteroides, 113
latisquama, 113
Bone-meal, 26
Bordeaux mixture, 35
Borders, *see* Flower-borders

Bouquets, *see* Cut-flowers
winter, 192
Boussingaultia, 188
Bowls, cut-flower, 290
Bowstring-Hemp, 250
Boxwood balls, 296
Brachycome, 66
Browallia, 60, 68
Brunella, 171
Bryophyllum, 235
Buds, specialized, 32
Bugloss, Italian, 102
Siberian, 170
Bulbels, 33
Bulblets, 33
Bulbs, 32
Cape, 267
definition of, 140
depth to plant, 149
forcing, 266
groups of indoor, 258
growing in water, 267
hardy forcing, 260
indoor, 258, 271
planting annuals among, 149
preparing for forcing, 264
rock-garden, 177
spring-flowering, 148
storing potted, 264
time to plant hardy, 148
treatment after flowering, 148
where to plant, 140
Butomus, 187
Butter-and-Eggs, 173
Buttercup, Creeping, 174
Butterfly-Weed, 108

Cabomba, 187
Cactus, 234
Christmas, 235
Caladium esculentum, see Colocasia
Fancy-leaved, 277
Calandrinia, 177
Calendula, 54, 69
California Poppy, 56
Calimeris, 108
Calla, 226, 270
Lily, *see* Calla
Calla, palustris, 187
Calliopsis, 54, 56, 69
Callistephus, 42
Calonyction, 188
Campanula carpatica, 110, 171
Medium, 120
persicifolia, 104
pyramidalis, 120
rotundifolia, 171
Campsis, 191
Candle arrangements, 296
Candytuft, Annual, 56, 68, 69
Hardy, 172
evergreen, 100
Cannas, culture of, 165
propagation of, 165
uses of, 164, 276
varieties of, 164
Canterbury Bell, 120
Cape Bugloss, 66
Cardinal-Climber, 190
Cardinal-Flower, 114, 187
Cardiospermum, 189
Carpet Bugle, 170
Cassia, 113
Cast-Iron Plant, 242
Castor-Bean, 64
Catananche, 199
Catchfly, 67
Catmint, Mussins, 173
Cat-Tail, 187, 200
Celosia argentia, 66
argentia, var. *cristata,* 66, 68
Childsii, 66
Centaurea Cyanus, 54, 68
imperialis, 54
montana, 104
Centranthus, 104
Cerastium, 98, 171
Ceratostigma, 113
Chameleon Amaranth, 66
Cheiranthus, 171
Chelone, 113
Chemical fertilizers, *see* Commercial Fertilizers
Chewing insects, 34
China aster, 42, 69
Chinese Lantern Plant, 200
Chinese Wool-Flower, 66, 69

Chionodoxa, 146, 177
Chlorophyll, function of, 5
Christmas-Rose, 172
Christmas trees, 298
Chrysanthemum, annual, 60, 68, 69
arcticum, 80, 171
carinatum, 60
coccineum, 78
hardy garden, 78
hortorum, see *C. morifolium*
indoor culture of, 227
judging scales for, 324
Leucanthemum, 80
maximum, 80
morifolium, 78
Parthenium, 66
tricolor, see *C. carinatum*
uliginosum, 80
varieties of hardy, 80
Cigar-Plant, 276
Cimicifuga, 110
Cineraria, 235
Clarkia, 54, 68
Claytonia, 98
Clematis Jackmani, 191
Japanese, 191
paniculata, 191
recta, 104
Cleome, 60, 68
Climbing plants, 188
Clover, Bush, 114
Cobœa scandens, 189
Cockscomb, Common, 66, 69
Feather, 66
Codiæum, 246
Cohosh, 110
Colchicum, 177
Coldframes, 217
flower seeds in, 30
starting perennial seeds in, 72
Coleus, 244, 276
Collinsia, 66
Colocasia esculenta, 165
Color, combinations for gardens, 18
contrasts in garden, 20
harmony suggestions, 16, 288
in the garden, 16
Color, suggestions for gardens, 17, 18
Columbine, 74
culture of, 75
propagation of, 75
species of, 170
Commercial fertilizer, 25, 26
Compost pile, 23
Coneflower, Clasping, 67
Cutleaf, 112
Erfurt, 67
Purple, 110
Showy, 116
Convallaria majalis, 98, 171
Convolvulus, 66
Coral Bells, 106, 172
Cordyline, 245, 276, 277
Coreopsis Drummondii, 54
elegans, see *C. tinctoria*
lanceolata, 104
marmorata, see *C. tinctoria*
Perennial, 104
Stillman, 67
tinctoria, 56
Cormels, 33
Corms, 32
Cornflower, Annual, 54
Mountain, 104
Cosmos, 56, 68
Cranesbill, 104, 172, 178
Iberian, 110
Creeping Jenny, 173, 178
Crocus, Autumn, 177
indoor culture of, 263
susianus, 146, 177
vernus, 146, 177
Crop rotation, preventing diseases by, 35
Crosswort, Common, 171
Croton, 246, 276
Crown Imperial, 146, 177
Crown-of-Thorns, 235
Crucianella, 171
Cucumber, Wild, 189
Cultivation, 37
Cup-Flower, 177
Cuphea, 276
Cupids Dart, 199
Cut-flowers, arrangement of, 287

Cut-flowers, baskets for, 290
behavior of, 282
bowls for, 290
chemicals for, 284
Christmas arrangements of, 292
color schemes for, 288
container for, 289
Easter arrangements of, 292
holders for, 290
judging arrangements of, 325
packing, 286
preparing for exhibition, 286
proper care of, 281
refrigeration for, 284
shipping, 286
St. Valentine arrangements of, 294
stem treatment of, 284
Thanksgiving arrangements of, 294
treatment of, 283
use of foliage with, 289
vases for, 290
Cuttings, 209
leaf, 6
perennial plant, 33
potting rooted, 207
preparation of, 210
sand for rooting, 210
soft-wood, 209
stem, 209
Cutworms, 34
Cyclamen, 226
Cyperus alternifolius, 187, 256
Papyrus, 187
Cyrtomium, 248

Daffodil, 142
Peruvian, 165
Dahlias, classification of, 159
culture of, 162
disbudding, 163
diseases of, 163
insects on, 163
judging scales for, 324
propagation of, 162
pruning, 163
uses of, 159
Dahlias, varieties of, 159
when to plant, 162
winter storage of, 164
Daisy, Arctic, 80
English, 98
Michaelmas, 76
Orange African, 60
Painted, *see* Pyrethrum
Shasta, 80
Swan River, 66
Datura, 66, 68
Dawn-Flower, Blue, 189
Day-Lily, Lemon, 100
Tawny, 110
Decorations, Christmas, 296
church, 298
floral, *see* Cut-flowers
formal, 298
hall, 298
informal, 298
material for, 300
miscellaneous, 294
reception, 298
special, 296
wedding, 298
Delphinium, Annual, 56
culture of, 56, 81
hardy, 171
propagation of hardy, 81
species of hardy, 81
varieties of hardy, 82
Dianthus, 68, 69
Allwoodi, 84
barbatus, 84, 120, 171
chinensis, 56
deltoides, 84, 171
hardy, 82
latifolius, 84
plumarius, 84, 171
Dicentra eximia, 98
formosa, 171
spectabilis, 98
Dictamnus, 104
Digitalis, 120
Dimorphotheca, 60, 69
Dioscorea, 191
Diseases, garden flower, 33-35
house-plant, 216
preventing plant, 34, 35

Division, 30-33
Dolichos, 189
Doronicum, 99
Dracæna fragrans, 246
indivisa, see Cordyline
Sanderiana, 247
Dragonhead, False, 111
Dragon-Plant, 246
Dried blood, 26
Dropwort, 171
Dusty Miller, 276
Dutchmans-Breeches, 178
Dutchmans Pipe, 191

Echinacea, 110
Echinocystis, 189
Echinops, 104
Edelweiss, 172
Eichhornia, 187
Elephant-Ear Plant, 165
Elodea, 187
Emilia, 66
Equipment for gardens, 36
Erianthus, 188
Erigeron bellidifolius, 171
speciosus, 104
Erinus, 171
Eryngium, 110, 200
Erysimum, 171
Erythronium, 99
Eschscholzia, 56, 68, 69
Eulalia, *see* Miscanthus, 187
Euphorbia corollata, 110
epithymoides, 99, 171
heterophylla, 66, 69
marginata, 67, 68
polychroma, see *E. epithymoides*
splendens, 235
Euonymus, 277
Eupatorium, 113
Everlasting Rose, 196
Swan River, 196
Winged, 198
Everlastings, *see* Strawflowers

Fanwort, 187
Farfugium, *see* Ligularia
Felton, quoted, 312
Ferns, Asparagus, see *Asparagus plumosus*
Boston, 247, 277
culture of, 248
Holly, 248
indoor, 247-250
Maidenhair, 248
Spider, 248
Sword, 247
Ferneries, 205
drainage for, 205
potted plants in, 205
Fertilizers, 24-26
garden, 24
house-plant, 203
Feverfew-Chamomile, 63
Ficus elastica, 255
lyrata, 256
pondurata, see *F. lyrata*
Fig-Marigold, Rose, 235
Filipendula, 171
Fish, use of in pools, 183
Flag, Blue, 187
Sweet, 187
Yellow, 187
Flats for seed-sowing, 211
Flax, Perennial, 111
Yellow, 173
Fleabane, Oregon, 104
Fleece-Flower, 116
Floral design, *see* Cut-flowers
Floriculture, definition of, 1
Floss-Flower, 58, 177
Flower arrangement, *see* Cut-flowers
Flower-beds, 10, 12
Flower-borders, 10
size of, 10
suggestions on arranging, 14-16
Flower-growing, indoor, 201
Flower, Guinea-Hen, 146
Pin-Cushion, 64
Flower-shows, fall, 319
judging, 323
judging scales for, 324
management of, 312
premium lists for, 314, 317
premiums for, 316
rules for, 314

Flower-shows, special rose, 321
spring, 317
staging, 322
value of, 310
Flower stakes, 37
Flowering plants, judging scale for, 325
Flowering-rush, 187
Flowers, function of, 7
improvement of, 7
wild, 178
Foliage plants, judging scale for, 325
Foliage plant, *see* Coleus
Foam-Flower, 175
Forget-Me-Not, 58, 100, 173, 187
Fountain-Grass, 188
Fountain-Plant, 245
Four O'Clock, 63
Foxglove, 120
Freesia, 267
Fritillaria imperialis, 146, 177
meleagris, 146, 177
Fruit, 7
Fruits, decorative, 7, 200
Fuchsia, 228
Trailing, 277
Fungicides, 34
Funkia, *see* Hosta

Gaillardia, Annual, 60, 69
aristata, 110
grandiflora, see *G. aristata*
Lorenziana, see *G. pulchella*
Perennial, 110
picta, see *G. pulchella*
pulchella, 60
Galanthus Elwesii, 177
nivalis, 142
Galega, 110
Galtonia, 165
Garden, care and maintenance, 28
Garden-clubs, constitution for, 307
organization of, 302
programs for, 304
purpose of, 301
speakers for, 307
Garden-clubs, value of, 301
Garden flowers, requirements of, 14
paths, 10
pests, 33-35
plants, 9-15
tools, 36
Gas, house-plants injured by, 213
Gasplant, 104
Gaura, 67
Gayfeather, 111, 114
Geranium, 276
Common, 228
ibericum, 110
ivy, 277
Martha Washington, 228
sanguineum, 104
species of hardy, 172
varieties of common, 230
Germander, American, 175
Gentian, 171
Geum, 104, 172
Gilia, 69
capitata, 60
Globe, 60
tricolor, 177
Gladiolus, classification of, 155
culture of, 156
fertilizers for, 156
history of, 154
indoor culture of, 270
judging scale for, 325
planting combinations of, 154
propagation of, 155
species of, 154
storing corms of, 158
treating corms of, 156
varieties of, 155
Globe-Amaranth, 199
Globe-Flower, 102, 175
Globe Thistle, 104
Glory-of-the-Snow, 146, 177
Gloxinia, penstemon, 45
Gloxinias, 271
Goats Rue, 110
Godetia, 67
Golden Feather, 66, 276
Goldenrod, 116, 200
Golden-tuft, 97, 170

Goldfish for pools, 183
Gold-Moss, 100
Gomphrena, 199
Goutweed, 170
Grape-Hyacinth, 146, 177
Grasses, ornamental, 187
Grass, Fountain, 188
  Plume, 188
  Reed Canary, 173
  Variegated, 257
Grevillea, 256, 276, 277
Growth, essentials, 7
Guinea-Hen Flower, 177
Gypsophila, Creeping, 172
  elegans, 56, 68
  paniculata, 106, 200
  repens, 172

Hanging-baskets, 278
Harebell, Carpathian, 110
  English, 171
Hawkweed, Orange, 172
Heavenly Blue, 189
Hedera, 257
Helleborus niger, 172
Helenium autumnale, 114
  Hoopesii, 100
Helens Flower, 114
Helianthemum, species of, 172
Helianthus annuus, 61
  cucumerifolius, see *H. debilis*
  debilis, 61
  decapetalus, 114
  Maximiliani, 114
  rigidus, see *H. scaberrimus*
  scaberrimus, 114
Helichrysum, 68, 196
Heliopsis, 114
Heliotrope, 236, 276
  Garden, 108
Heliotropium peruvianum, 236
Helipterum, 196
Hemerocallis flava, 100
  fulva, 110
  species of, 110
Hen-and-Chickens, 235
Hepatica, 172, 178
Hesperis, 100, 120
Heuchera, 106, 172
Hibiscus Moscheutos, 114, 187
Hieracium, 172
Hippeastrum, 268
Hollyhock, Annual, 54, 68, 69
  Perennial, 120
Honesty, 120, 200
Hosta, species, 111
Hotbeds, 217
  care of, 220
  starting seeds in, 221
  surface, 220
Houseleek, 175, 235
House-plants, diseases of, 216
  fertilizers for, 202
  flowering, 222-238
  foliage, 239-257
  humidity affecting, 213
  insects on, 216
  light for, 214
  propagation of, 208
  seed sowing of, 211
  soils for, 202
  summer care of, 215
  temperature for, 213
  watering, 214
  winter care of, 212
Hoya, 236
Humidity for house-plants, 213
Humulus, 189
Hunnemannia, 67
Hyacinths, Dutch, 146
  indoor culture of, 260
  Summer, 165
  Water, 187
Hyacinthus orientalis, 146
Hydrangea, 200, 236
Hydrocleis, 187
Hymenocallis, 165

Iberis amara, 56
  gibraltarica, 100
  sempervirens, 100, 172
  umbellata, 56
Ice-Plant, 67
Immortelles, *see* Strawflowers
Impatiens, 230, 277
  Balsamina, 61
  Holstii, 230
  Sultana, 230

Incarvillea, 172
Indigo, False, 104
Insecticides, 34
Insects, garden, 33-35
  house-plant, 216
Ipomœa, species of, 189, 190
Iris, 84, 187
  culture of, 88
  English, 146
  propagation of, 86
  Spanish, 146
  species of, 86, 172
  xiphioides, 146
  Xiphium, 146
Irrigation, 37
Ismene, *see* Hymenocallis
Ivy, English, 257, 277
  German, 277
  Ground, 277
  Kenilworth, 173, 190, 277
  Parlor, 277
Ixia, 267

Jack-in-the-Pulpit, 178
Jerusalem-Cherry, 238
Jew, Wandering, 277
Jimson-Weed, 200
Jonquil, 142
Josephs Coat, 66
Jupiters Beard, 104

Kochia, 56

Laceflower, Blue, 67
Ladys Ear-Drops, 228
Lantana, 277
Larkspur, Annual, 56, 68, 69
  Hardy, 81, 171
Lathyrus latifolius, 111, 191
  odoratus, 50
Lavandula Spica, 172
Lavender, 172
Lavatera, 68
  rosea, see *L. trimestris*
  trimestris, 61
Layering, 31, 32
  air, 255
  Chinese, 255
Leadwort, Blue, 113, 174
Leaf-cuttings, 6
Leaf-mold, preparation of, 23
  uses in garden, 23
Leaves, function of, 5
Leontopodium, 172
Leopards-Bane, 99
Leopard Plant, 250
Leptosyne, 67
Lespedeza, 114
Liatris pycnostachya, 111
  scariosa, 114
  spicata, 114
Light, effect on leaves, 6
  effect on stem growth, 5
  requirements, 6
Ligularia, 250
Lilies, classification of, 151
  culture of, 153
  depth to plant, 153
  hardy garden, 149-154
  planting cold-storage bulbs of, 153
  soil for, 153
  species of, 151
  when to plant, 153
  where to plant, 153
Lily, Chinese Sacred, 142
  Jacobean, 165
  of-the-Nile, 232
  of-the-Valley, 98, 171
Limonium, 111, 175, 198, 199
Limnocharis, *see* Hydrocleis
Linaria bipartita, 67
  Cymbalaria, 173, 190
  vulgaris, 173
Linum grandiflorum, 67, 69
  flavum, 173
  perenne, 111
Lobelia, 69, 276
  cardinalis, 114, 187
  Erinus, 61
  Great Blue, 114
  syphilitica, 114
  Trailing, 277
Lobularia, see *Alyssum maritimum*
Loosestrife, Clethra, 111
  Purple, 187
  Rose, 106

Lotus, 187
Love-in-a-Mist, 58
Love-in-a-Puff, 189
Love-Lies-Bleeding, 66
Lunaria biennis, 120, 200
Lupine, Annual, 58
  Perennial, 106
Lupinus Hartwegii, 58
  hirsutus, 58
  luteus, 58
  polyphyllus, 106
Lychnis, 68
  chalcedonica, 106
  Coeli-rosa, 67
  species of, 173
Lysimachia clethroides, 111
  Nummularia, 173
Lythrum, 106, 187

Macleaya cordata, see Bocconia
Maize, Striped, 67
Malcomia, 67, 68
Mallow Herb Tree, 61
  Rose, 114
  Swamp rose, 114
Maltese Cross, 106
Manure, hotbed, 219
  uses of, 25
Maple, Flowering, 231
Marguerite, Golden, 102
Marigold, African, 64, 69
  French, 64, 69
  Marsh, 178
  Mexican, 64
  Pot, 54
Marsh-mallow, 187
Marvel-of-Peru, 63
Matricaria, 63
Mathiola bicornis, 67
  incana, 63
Maurandia, 190, 277
May Apple, 174, 178
Meadow Rue, 106
  Yunnan, 112
Mentzelia, 67
Mertensia, 100, 173, 187
Mesembryanthemum, 67, 235, 277
Mexican Burning Bush, 56
Mignonette, 64, 276
Milkweed, 200
Mimosa pudica, 67
Mimulus luteus, 67
  moschatus, 67
Mirabilis, 63
Miscanthus, 187
Mist-Flower, 113
Momordica, 190
Monarda, 111
Money Plant, 120, 173, 200
Moneywort, 120, 173, 200
Monkey-Flower, 67
Monkshood, Azure, 112
Montbretia, 166
Moonflower, 188
Morning-Glory, Common, 189
  Dwarf, 66
  Japanese, 189
Moss, Rose, 58
Mourning Bride, 64
Mugwort, 113
Mulching, 37, 38
Mulch, purpose of, 37
Mullein, 200
  Olympic, 108
Muscari botryoides, 146, 177
  indoor culture of, 263
Musk-Plant, 67
Myosotis, 58, 100, 173, 187
Myriophyllum, 187

Narcissus, 177
  classification of, 142
  indoor culture of, 262
  Paper White, 142
Nasturtium, 69, 190, 276
Nelumbium, 187
Nemophila, 69
  insignis, 177
  Menziesii, 67
Nepeta hederacea, 277
  Mussini, 173
Nephrolepis, 247
Nerium Oleander, 237
Nicotiana alata, 63, 68
  sylvestris, 64, 68
  Sanderæ, 68
Nicotine sulfate, 135
Nierembergia, 177, 276
Nigella, 58, 68

Nitrate of soda, *see* Sodium Nitrate
Nymphæas, classification of, 186
culture of 179

Œnothera acaulis, 67
biennis, 106
fruticosa, 106
missouriensis, 106, 173
speciosa, 111
Oil sprays, 216
Oleander, 237
Old Man, 113
Old Woman, 113
Oplismenus, 257
Opuntia, 173
Orchids, native, 173, 178
Oxalis, Bulbous, 267
corniculata, 67, 69
rosea, 67, 68
rubra, 67

Pachysandra terminalis, 173
Pæonia, species of, 90
Painted Tongue, 64
Palms, 252, 254, 276
culture of, 254
species of, 254
Pandanus utilis, 255
Veitchi, 255
Pansy, 44, 45, 237
Tufted, 112, 175
Papaver nudicaule, 89, 173
orientale, 88
Rhœas, 58
somniferum, 58
Paper-Plant, Egyptian, 187
Parrots-Feather, 187
Pasque-Flower, European, 170
Patience Plant, *see* Impatiens
Pea, Perennial, 111, 191
Pelargonium domesticum, 228
hortorum, 228
Pennisetum, 188
Penstemon gloxinoides, 45
lævigatus, 106
Smooth, 106
Torreyi, 106
Peonies, 90
bloom types of, 92
Peonies, culture of, 94
judging scale for, 325
propagation of, 94
varieties of, 92
Perennial, definition of, 70
Perennials, advantages of hardy, 70
autumn-flowering, 112-116
early summer-flowering, 102-108
fall planting of hardy, 72
grown as annuals, 39
hardy, from seed, 71
late summer-flowering, 108-112
planting of hardy, 72
sources of hardy, 71
spring-flowering, 97
spring planting of hardy, 72
transplanting, 72
winter protection of, 72
Periwinkle, 102, 175
Pests, garden, 33
Petunia, 48, 68, 69, 238, 276
culture of, 48
varieties of, 48
Phacelia, 67, 69
Phalaris, 173
Phaseolus, 190
Phlox, Annual, 58, 68, 69, 177
culture of hardy, 96
Drummondii, 58, 177
hardy, 94, 178
propagation of hardy, 96
species of hardy, 95, 173, 174
varieties of hardy, 96
Photosynthesis, 6
Physalis, 200
Physostegia, 111
Pickerel-Weed, 187
Pilea, 239, 277
Pimpernel, 66, 177
Pincushion-Flower, 64
Pine, Norfolk-Island, 252
Pink, China, 56
Clove, 84
Grass, 84
Hardy, 82, 84, 171
Maiden, 84, 171
Perpetual-flowering, 84

Pink, Scotch, 84, 171
Plant, Artillery, 277
Plant cells, 1
Plant-container, 203, 206, 278
Plant-food, essential elements of, 2, 24
Plant-growth essentials, 7
Plant tissues, 2
Plantain-Lily, 110
Plantain, Poor Robins, 171
Planting, garden flower, 26, 27
  hints on garden, 27
  preparing soil for, 27
Plants, growth habits of, 14
  herbaceous, 5
  kind to use, 27
  native, 178
  study of, 8
  wild-gardens, 178
  woody, 4
Platycodon, 112
Plumbago, 174
Plume-Grass, 188
Podophyllum, 174
Polemonium cæruleum, 106
  Creeping, 100
  reptans, 100, 174
Polianthes tuberosa, 165
Polygonum, 116
Pond-Weed, Cape, 187
Pontederia, 187
Pools, *see* Water-gardens
Poppy, 68, 69
  California, 56
  Corn, 58
  culture of Oriental, 89
  Hardy, 88
  Iceland, 89, 173
  Opium, 58
  Oriental, 88
  Plume, 108
  Prickly, 66
  varieties of Oriental, 89
  Water, 187
  Yellow Tulip, 67
Porch-boxes, *see* Window-boxes
Portulaca, 58, 68, 69, 177
Pot-Marigold, 54
Potassium sulfate, 26
Potassium sulfide, 135
Pots, drainage for, 207
  flower, 203
Potting, 206
Prickly-Pear, 173
Prickly Poppy, 66
Primroses, 231
  English, 100, 106
Primula, 174
  acaulis, see *P. vulgaris*
  species of, 231
  vulgaris, 100
Propagation, cutting method of, 33, 209
  division method of, 30-33
  garden flower, 28-33
  seed method of, 29, 41, 71, 194, 211
Pruning, object of, 38
Pteris, 248, 277
Pulmonaria, 174
Purslane, Rock, 177
Puschkinia, 177
Pyrethrum, 78
  uliginosum, see *Chrysanthemum*

Quamoclit, 190
Queen Annes Lace, 178, 179

Ranunculus asiaticus, 267
  repens, 174
Red-spider, control of, 97
Reed, Giant, 187
Re-potting, 208
Reseda odorata, 64
Respiration, 6
Rhododendron, 222
Rice, Wild, 188
Ricinus, 64, 68
Rock-Cress, 170
  Alpine, 98
  Purple, 98
Rock gardens, 12
  construction of, 169
  plants for, 170-177
  soil for, 169
  where to build, 167
Rock-Rose, 172

Roots, 2, 3
function of, 2
injury of, 3
as storage organs, 3
Rosa Hugonis, 128
multiflora, 128
rugosa, 124
setigera, 128
Wichuraiana, 128
xanthina, 128
Rose hips, 200
Rose-of-Heaven, 67
Rose-Moss, 177
Rose-plants, field-grown, 132
greenhouse-grown, 133
how to order, 132
Roses, Austrian Briar, 126, 138
Baby Rambler, 126, 138
beds for, 131
bench, 132
budded, 132
Climbing Hybrid Tea, 128
Climbing Polyantha, 128
cold climate, 121-128
culture of, 130
diseases of, 134
dusting, 135
Dwarf Polyantha, 126
fertilizers for, 131
hardy climbing, 128, 139
how to plant, 133
Hybrid Perpetual, 121, 137
Hybrid Tea, 124, 138
insects on, 135
judging scales for, 325
leaf-spot of, 134
many-flowered, 128
Memorial, 128
mildew on, 134
mild climate, 128
misc. hardy species of, 139
Moss, 124, 137
Noisette, 128
own-root, 132
Pernetiana, 126
Prairie, 128
protecting climbing, 137
pruning, 133
Rambler, 128
Roses, varieties of Rugosa, 137
soils for, 130
spraying, 135
Sweetbrier, 128, 139
Tea, 128
where to grow, 130
winter protection of, 136
Rudbeckia, Annual, 69
amplexicaulis, 67
bicolor, 67
laciniata, 112
Newmani, see *R. speciosa*
purpurea, see *Echinacea*
speciosa, 116
Rubber-Plant, 255
Ruskin, quoted, 88

Sage, Azure, 116
Bethlehem, 174
Violet, 112
Sagittaria, 187
Salpiglossis, 64, 69
Salvia azurea, 116
nemorosa, 112
splendens, 69
virgata, see *S. nemorosa*
Sand, propagating, 210
Sand-verbena, 66
Sandwort, Mountain, 170
Sanguinaria, 174
Sanseveria, 250
Sanvitalia, 64, 69, 177
Saponaria, 68
ocymoides, 100, 174
Vaccaria, 67
Satin-Flower, 67
Saxifraga, 174
Scabiosa, 64, 68, 69
Scarlet Flax, 67
Runner, 190
Scilla, 146, 177
Screw-Pine, 255
Sea-Holly, 110
Sea-Lavender, 111, 175, 198, 199
Sedum acre, 100
Showy, 116
species of, 102, 174
spectabile, 116
Seed catalogues, 9

Seed-pods, decorative, 200
Seed-sowing, 29, 30, 41, 211
Seedlings, thinning of, 36, 42
Seeds, importance of, 29
  planting in garden, 41, 42
  proper depth to plant, 29, 30
  shading after planting, 30
Self-Heal, Webb, 171
Sempervivum, 175, 235
Senecio, 235
Senna, Wild, 113
Sensitive-Plant, 67
Shifting, 208
Shooting-Star, 178
Silene, 67, 68
Silk-Oak, 256, 276, 277
Skunk-Lily, 146
Slips, *see* Cuttings
Snake-plant, *see* Sanseveria
Snakeroot, Black, 110
Snapdragon, 49, 68, 69
Sneezeweed, Orange, 100
Sneezewort, 108
Snow-in-Summer, 98, 171
Snow-on-the-Mountain, 67
Snowdrop, 142, 177
Soap, fir tree oil, 217
  lemon-oil, 217
Soapwort, Cow, 67
  Rock, 100, 174
Sodium nitrate, 26
Solanum jasminoides, 277
  Pseudo-Capsicum, 238
Solidago, species, 116
Soil, garden, 22, 23
  potting, 202
  preparation of, 72
  suggestions on improving, 23
  texture of, 4
Solomons Seal, 178
Southernwood, 113
Speedwell, 175
  Clump, 112
  Spike, 108
Spider-Flower, 60
Spiræa, *see* Astilbe
Spraying, for garden insects, 34
  house-plants, 217
  materials for, 34, 35
Sprekelia, 165
Spring Beauty, 98, 178
Sparkling, 37
Spurge, Cushion, 99, 171
  Flowering, 110
  Painted, 66
  Squirrel-Corn, 178
Stachys, 175
Staking, 37
Starwort, 76
Statice, 69, *see also* Limonium
  Russian, 198
Stem-cuttings, 4
Stems, 4, 5
  effect of pruning, 5
  function of, 4
  structure of, 4
Stock, Annual, 63
  Grecian, 67
  Virginian, 67
Stokesia, 175
Stomata, Functions of, 5
Stonecrop, 100
Strawflower, Common, 196
Strawflowers, 192
  arrangement of, 196
  culture of, 194
  preparation of, 196
  uses of, 194
Succulents, 234
Suckers, 31
Sucking insects, 34
Sulfate of ammonia, *see* Ammonium sulfate
Sulfur, powdered, 35
Sultana, *see* Impatiens
Summer Cypress, 56
Sundrops, Dandelion, 67
  Perennial, 111
Sunflower, Annual, 61, 69
  Cucumber-leaved, 61
  Maximilian, 114
  Orange, 114
  Perennial, 114
  Prairie, 114
Susan, Black-eyed, 277
Swan River Daisy, 69
Sweet Alyssum, 54, 68, 276
Sweet Flag, 187

Sweet Peas, culture of, 50
judging scale for, 325
varieties of, 51
Sweet Rocket, 100, 120
Sweet Scabious, 64
Sweet Sultan, 54
Sweet William, 84, 120, 171
Everblooming, 84

Table decorations, 290
Tagetes erecta, 64
patula, 64
signata pumila, 64
Tassel-Flower, 66
Teazle, 200
Tecoma, *see* Campsis
Temperature for house-plants, 213
Teucrium, 175
Tiarella, 175
Tiger-Flower, 166
Tigridia, 166
Thalictrum adiantifolium, 106
aquilegifolium, 106
dipterocarpum, 112
Thermopsis, 108
Thinning, 36, 42
Thistle, Globe, 200
Throatwort, 67
Thunbergia, 277
alata, 190
Thyme, 172
Thymus, 175
Toadflax, Cloven-Lip, 67
Tobacco dust, 35
Flowering, 63
Trachelium, 67
Trachymene, 67
Tradescantia fluminensis, 257
Transpiration, 5
Trillium, 175, 178
Tritonia, 166
Trollius, 102, 175
Tropæolum majus, 190
peregrinum, 190
Trumpet-Creeper, 191
Tubers, 32, 33
Tuberose, 165
Tulips, classification of, 143
Tulips, indoor culture of, 260
outdoor culture of, 148
Tunic-Flower, 112, 175
Tunica Saxifraga, 112, 175
Turtlehead, 113, 178
Typha, 187

Umbrella Plant, 256

Valerian, Greek, 106, 174
Valeriana coccinea, see Centranthus
officinalis, 108
Varieties, Use of resistant, 35
Vases, cut-flower, 290
Verbascum, 108
Verbena, 68, 69
erinoides, 177
hybrida, 64
Sand, 66, 177
venosa, 177
Veronica incana, 175
longifolia, 112
repens, 175
rupestris, 175
spicata, 108
Victoria, 187
Vinca major, 277
minor, 102, 175
Vine, Allegheny, 190
Canary-Bird, 190
Cinnamon, 191
Cup-and-Saucer, 189
Cypress, 190
Japanese Hop, 189
Madeira, 188
Potato, 277
Vines, annual, 188
flowering, 188
hardy perennial, 190
indoor, 257
ornamental, 188
Viola cornuta, 112, 175
tricolor, 44, 237
Violets, 178
Dog-tooth, 99, 178
Volck, 216

Wallflower, 171

Wandering Jew, 257, 277
Water-Arum, 187
Water-gardens, 12, 179
  construction of, 181
  planting of, 181
  plants for, 184, 187
  site for, 180
  soil for, 183
Water-Hyacinth, 187
Water-Lilies, 184
  planting, 183
  Royal, 187
  soil for, 183
  species and varieties of, 186
  winter care of, 184
Water-Poppy, 187
Water-Weed, 187
Watering, 3, 37
  house-plants, 214
Watsonia, 166
Wax-Plant, 236
Wedding decorations, 298
Weeding, 36
Wild-gardens, 178
Wind-Flower, 170
Window-boxes, construction of, 272
  flowering plants for, 276
  foliage plants for, 276
  plans for, 277
  plants for shaded, 277
Window-boxes, plants for winter, 277
  selecting plants for, 276
  soil for, 274
  trailing plants for, 277
  uses of, 272
Winter bouquets, berries in, 200
Wisteria, 191
Wood-ashes, 26
Woodruff, 66
Worms in soil, 217
Wormwood, Beach, 113, 170
Woundwort, Woolly, 175
Wreaths, Christmas, 296

Yarrow, Pink, 108
  Sweet, 170
  Woolly, 170
Yucca filamentosa, 108, 175

Zantedeschia æthiopica, 226, 270
  Elliotiana, 226, 270
Zebra-Plant, *see* Sanseveria
Zebrina pendula, 257
Zinnia, 68, 69
  culture of, 51
  elegans, 51
  Haageana, 51, 177
  varieties of, 52
Zea Mays var. *japonica,* 67, 68
Zizania, 188

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